Section 1: Mass

Question 1 | Writing mass in kilograms

1. Study: When changing grams to kilograms, divide by 1000.

Think, “A large number of grams will give a small number of kilograms”.

Examples: Do you notice that the decimal comma separates the kilograms from the grams?

<table>
<thead>
<tr>
<th>a) 3000g = 3 kg</th>
<th>b) 5479g = 5,479kg</th>
<th>c) 4048g = 4,048kg</th>
<th>d) 6001g = 6,001 kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>because 3000 ÷ 1000 = 3</td>
<td>because 5479 ÷ 1000 = 5,479</td>
<td>because 4048 ÷ 1000 = 4,048</td>
<td>because 6001 ÷ 1000 = 6,001</td>
</tr>
</tbody>
</table>

2. Complete.

<table>
<thead>
<tr>
<th>a) 1045g = 1,045 kg</th>
<th>b) 2687g = 2,687kg</th>
<th>c) 8000g = 8 kg</th>
<th>d) 5003g = 5,003kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>because 1045 ÷ 1000 = 1,045</td>
<td>because 2687 ÷ 1000 = 2,687</td>
<td>because 8000 ÷ 1000 = 8</td>
<td>because 5003 ÷ 1000 = 5,003</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>e) 5324g = 5,324kg</th>
<th>f) 9702g = 9,702kg</th>
<th>g) 7009g = 7,009kg</th>
<th>h) 3077g = 3,077kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>because 5324 ÷ 1000 = 5,324</td>
<td>because 9702 ÷ 1000 = 9,702</td>
<td>because 7009 ÷ 1000 = 7,009</td>
<td>because 3077 ÷ 1000 = 3,077</td>
</tr>
</tbody>
</table>

3. Study the following examples. Take note of the unnecessary “decimal zeros”.

<table>
<thead>
<tr>
<th>a) 3800g = 3,800 kg</th>
<th>b) 8460g = 8,460 kg</th>
<th>c) 5090g = 5,090 kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>= 3,8 kg</td>
<td>= 8,46 kg</td>
<td>= 5,09 kg</td>
</tr>
<tr>
<td>because 3800 ÷ 1000 = 3,8</td>
<td>because 8460 ÷ 1000 = 8,46</td>
<td>because 5090 ÷ 1000 = 5,09</td>
</tr>
</tbody>
</table>

4. Complete. Do not write any unnecessary “decimal zeros”.

<table>
<thead>
<tr>
<th>a) 1780g = 1,78 kg</th>
<th>b) 9400g = 9,4kg</th>
<th>c) 3070g = 3,07kg</th>
<th>d) 5100g = 5,1kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>= 1,78 kg</td>
<td>= 9,4kg</td>
<td>= 3,07kg</td>
<td>= 5,1kg</td>
</tr>
<tr>
<td>because 1780 ÷ 1000 = 1,78</td>
<td>because 9400 ÷ 1000 = 9,4</td>
<td>because 3070 ÷ 1000 = 3,07</td>
<td>because 5100 ÷ 1000 = 5,1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>e) 3070g = 3,07kg</th>
<th>f) 5260g = 5,26kg</th>
<th>g) 8800g = 8,8kg</th>
<th>h) 4020g = 4,02kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>= 3,07kg</td>
<td>= 5,26kg</td>
<td>= 8,8kg</td>
<td>= 4,02kg</td>
</tr>
</tbody>
</table>

5. Study the following examples in which the masses are less than 1 kilogram.

<table>
<thead>
<tr>
<th>a) 700g = 0,700 kg</th>
<th>b) 657g = 0,657kg</th>
<th>c) 80g = 0,080kg</th>
<th>d) 4g = 0,004kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>= 0,7 kg</td>
<td>= 0,657kg</td>
<td>= 0,08kg</td>
<td>= 0,004kg</td>
</tr>
<tr>
<td>because 700 ÷ 1000 = 0,7</td>
<td>because 657 ÷ 1000 = 0,657</td>
<td>because 80 ÷ 1000 = 0,08</td>
<td>because 4 ÷ 1000 = 0,004</td>
</tr>
</tbody>
</table>

6. True or False? a) 60 g = 0,6 kg True: 0,06 b) 988 g = 9,88 kg True: 9,88

7. Complete. Do not write any unnecessary “decimal zeros”.

<table>
<thead>
<tr>
<th>a) 400g = 0,4 kg</th>
<th>b) 385g = 0,385kg</th>
<th>c) 70g = 0,07kg</th>
<th>d) 409g = 0,409kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>= 0,4 kg</td>
<td>= 0,385kg</td>
<td>= 0,07kg</td>
<td>= 0,409kg</td>
</tr>
<tr>
<td>because 400 ÷ 1000 = 0,4</td>
<td>because 385 ÷ 1000 = 0,385</td>
<td>because 70 ÷ 1000 = 0,07</td>
<td>because 409 ÷ 1000 = 0,409</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>e) 810g = 0,81kg</th>
<th>f) 3 g = 0,003kg</th>
<th>g) 54g = 0,054kg</th>
<th>h) 20 g = 0,02kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>= 0,81kg</td>
<td>= 0,003kg</td>
<td>= 0,054kg</td>
<td>= 0,02kg</td>
</tr>
</tbody>
</table>

8. Complete. [Mixed Questions]

<table>
<thead>
<tr>
<th>a) 2845g = 2,845kg</th>
<th>b) 52g = 0,052kg</th>
<th>c) 1500g = 1,5kg</th>
<th>d) 30g = 0,03kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>= 2,845kg</td>
<td>= 0,052kg</td>
<td>= 1,5kg</td>
<td>= 0,03kg</td>
</tr>
<tr>
<td>because 2845 ÷ 1000 = 2,845</td>
<td>because 52 ÷ 1000 = 0,052</td>
<td>because 1500 ÷ 1000 = 1,5</td>
<td>because 30 ÷ 1000 = 0,03</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>e) 742g = 0,742kg</th>
<th>f) 1g = 0,001kg</th>
<th>g) 905g = 0,905kg</th>
<th>h) 400g = 0,4kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>= 0,742kg</td>
<td>= 0,001kg</td>
<td>= 0,905kg</td>
<td>= 0,4kg</td>
</tr>
</tbody>
</table>

9. 10 080g = ............... [Circle the correct answer]

<table>
<thead>
<tr>
<th>a) 10,8 kg</th>
<th>b) 108 kg</th>
<th>c) 10,08 kg</th>
<th>d) 1,0080 kg</th>
</tr>
</thead>
</table>
| Circle 10,08 kg as the correct answer.
**Question 2 | Writing mass in grams**

1. **Study**: When changing kilograms to grams, multiply by 1000. Think, “A small number of kilograms will give a large number of grams”.

   Examples:
   
   a) \(3,5 \text{ kg} = 3500 \text{ g}\) because \(3,5 \times 1000 = 3500\)
   
   b) \(7,084 \text{ kg} = 7084 \text{ g}\) because \(7,084 \times 1000 = 7084\)
   
   c) \(9,02 \text{ kg} = 9020 \text{ g}\) because \(9,02 \times 1000 = 9020\)
   
   d) \(0,37 \text{ kg} = 370 \text{ g}\) because \(0,37 \times 1000 = 370\)

2. **Complete**.
   
   a) \(2,8 \text{ kg} = 2800 \text{ g}\)
   
   b) \(0,7 \text{ kg} = 700 \text{ g}\)
   
   c) \(0,62 \text{ kg} = 620 \text{ g}\)
   
   d) \(8,03 \text{ kg} = 8030 \text{ g}\)

3. **Complete. [Mixed Questions]**
   
   a) \(8,02 \text{ kg} = 8020 \text{ g}\)
   
   b) \(3,2 \text{ kg} = 3200 \text{ g}\)
   
   c) \(0,087 \text{ kg} = 87 \text{ g}\)
   
   d) \(9,44 \text{ kg} = 9440 \text{ g}\)

   e) \(4,09 \text{ kg} = 4090 \text{ g}\)
   
   f) \(0,337 \text{ kg} = 337 \text{ g}\)
   
   g) \(7,92 \text{ kg} = 7920 \text{ g}\)
   
   h) \(25 \text{ kg} = 25000 \text{ g}\)

   i) \(6,5 \text{ kg} = 6500 \text{ g}\)
   
   j) \(7,005 \text{ kg} = 7005 \text{ g}\)

   **Question 3 | Working with Fractions**

1. **Study the table**:

   a) \(250 \text{ g} = \frac{1}{4} \text{ kg} = 0,25 \text{ kg}\)
   
   b) \(500 \text{ g} = \frac{1}{2} \text{ kg} = 0,5 \text{ kg}\)
   
   c) \(750 \text{ g} = \frac{3}{4} \text{ kg} = 0,75 \text{ kg}\)

2. **Study the table**:

   a) \(100 \text{ g} = \frac{1}{10} \text{ kg} = 0,1 \text{ kg}\)
   
   b) \(300 \text{ g} = \frac{3}{10} \text{ kg} = 0,3 \text{ kg}\)
   
   c) \(900 \text{ g} = \frac{9}{10} \text{ kg} = 0,9 \text{ kg}\)

3. **Study the table**:

   a) \(200 \text{ g} = \frac{1}{5} \text{ kg} = \frac{3}{10} \text{ kg} = 0,2 \text{ kg}\)
   
   b) \(600 \text{ g} = \frac{3}{5} \text{ kg} = \frac{6}{10} \text{ kg} = 0,6 \text{ kg}\)
   
   c) \(800 \text{ g} = \frac{4}{5} \text{ kg} = \frac{8}{10} \text{ kg} = 0,8 \text{ kg}\)

4. **Complete**

   a) \(\frac{1}{2} \text{ kg} = 500 \text{ g}\)
   
   b) \(\frac{1}{4} \text{ kg} = 250 \text{ g}\)
   
   c) \(\frac{3}{4} \text{ kg} = 750 \text{ g}\)
   
   d) \(\frac{1}{5} \text{ kg} = 200 \text{ g}\)

   e) \(\frac{3}{4} \text{ kg} = 3750 \text{ g}\)
   
   f) \(\frac{1}{10} \text{ kg} = 2300 \text{ g}\)

5. **Complete**: Write your answers in decimal notation.

   a) \(\frac{1}{4} \text{ kg} = 0,25 \text{ kg}\)
   
   b) \(\frac{1}{10} \text{ kg} = 0,1 \text{ kg}\)
   
   c) \(\frac{1}{5} \text{ kg} = 0,2 \text{ kg}\)
   
   d) \(\frac{3}{4} \text{ kg} = 0,75 \text{ kg}\)

   e) \(\frac{3}{10} \text{ kg} = 0,3 \text{ kg}\)
   
   f) \(\frac{1}{2} \text{ kg} = 0,5 \text{ kg}\)

   g) \(\frac{1}{10} \text{ kg} = 0,1 \text{ kg}\)
   
   h) \(\frac{3}{5} \text{ kg} = 0,6 \text{ kg}\)

6. **Complete. Give your answers in grams**.

   a) \(\frac{1}{4} \text{ of 2 kg} = \frac{1}{4} \text{ of 2000 g} = 500 \text{ g}\)
   
   b) \(\frac{3}{10} \text{ of 1 kg} = \frac{3}{10} \text{ of 1000 g} = 300 \text{ g}\)
   
   c) \(\frac{1}{5} \text{ of 2 ½ kg} = \frac{1}{5} \text{ of 2500 g} = 500 \text{ g}\)

   d) \(\frac{3}{5} \text{ of 1 ½ kg} = \frac{3}{5} \text{ of 1500 g} = 900 \text{ g}\)

   e) \(0,1 \text{ of 5 kg} = \frac{1}{10} \text{ of 5000 g} = 500 \text{ g}\)

   f) \(0,3 \text{ of 1 kg} = \frac{3}{10} \text{ of 1000 g} = 300 \text{ g}\)
**Question 4 | Ordering and Comparing Mass**

1. Fill in >, < or = to make correct statements.

   a) \(1,5\text{kg} > 150\text{g}\)  
   b) \(1,02\text{kg} = 1020\text{g}\)  
   c) \(880\text{g} = 0,88\text{kg}\)  
   d) \(2500\text{g} > \frac{1}{4}\text{kg}\)  
   e) \(\frac{3}{4}\text{kg} > 340\text{g}\)  
   f) \(1150\text{g} < 11,5\text{kg}\)  
   g) \(10\text{g} < 0,1\text{ of } 1\text{kg}\)  
   h) \(0,09\text{kg} > 9\text{g}\)  
   i) \(1,45\text{kg} > 1405\text{g}\)

2. Order these objects from the lightest to the heaviest.  
   C , E , D , A , B

3. Order the masses from the heaviest to the lightest.

   a) \(3,509 \text{kg} \quad 3,09\text{kg} \quad 3059\text{g} \quad 3\frac{1}{2}\text{kg}\)

   b) \(5\frac{3}{4}\text{kg} \quad 5,04\text{kg} \quad 5\frac{4}{5}\text{kg} \quad 5\text{kg} 34\text{g}\)

4. Which of the following is heavier?

   a) 1kg of sand or 1kg of feathers.  
   b) \(1,5\text{kg of butter}\) or \(1\frac{1}{4}\text{kg of butter}\)

   *d) \(\frac{1}{2}\text{ of } 2\text{kg}\) or \(\frac{4}{5}\text{ of } 1,5\text{kg}\)

**Question 5 | Adding and Subtracting Mass**

1. Study: When adding or subtracting masses, first make sure that the units are the same.

   Examples:  
   a) \(1,73\text{kg} + 826\text{g}\)  
   b) \(23,75\text{kg} – 18\text{kg} 50\text{g}\)

   * Remember to line up the decimal comma.

2. Calculate:  
   a) \(45\text{kg} 85\text{g} – 27,5\text{kg}\) (answer in g)  
   b) \(572\text{g} + 12,9\text{kg}\) (answer in kg)

3. James bought \(3\frac{1}{4}\text{kg of bananas}, 8\text{kg} 80\text{g of meat and 65g of sweets.}\)
   Calculate the total mass of the goods in kg.  
   \(3,25\text{kg} + 8,08\text{kg} + 0,065\text{kg} = 11,395\text{kg}\)

4. Calculate the difference between 3kg and 755g.  
   Give your answer in kg.  
   \(3\text{kg} – 0,755\text{kg} = 2,245\text{kg}\)
**Question 6** | Multiplying Mass (Rate)

1. Complete:  
   a) \(1.5 \times 10 = 15\) kg  
   b) \(0.48 \times 10 = 4.8\) kg  
   c) \(7.25 \times 10 = 72.5\) kg  
   d) \(0.603 \times 100 = 60.3\) kg  

2. Complete:  
   a) \(2.5 \times 2 = 5000\) g = \(5\) kg  
   b) \(2.5 \times 4 = 10000\) g = \(10\) kg  
   c) \(1.2 \times 3 = 3600\) g = \(3.6\) kg  
   d) \(3.8 \times 2 = 7600\) g = \(7.6\) kg

3. The mass of 1 packet of cat food is \(2.5\) kg.  
   What is the mass of 3 packets? \(2500\) g \(\times\) 3 = 7500 g = 7.5 kg

4. One bag of sugar has a mass of \(3\frac{1}{4}\) kg.  
   What is the mass of 10 bags? \(3.25\) kg \(\times\) 10 = 32.5 kg

5. Mom buys five \(1.2\) kg containers of flour.  
   How many kg’s of flour did she buy in total? \(1200\) g \(\times\) 5 = \(6000\) g = 6 kg

6. One item has a mass of \(0.405\) kg. One hundred items have a mass of \(40.5\) kg. \(0.405 \times 100 = 40.5\)

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**Question 7** | Dividing and Multiplying Mass (Rate)

1. The mass of 3 apples is 360 g.  
   a) What is the mass of 1 apple? \(360\) g \(\div\) 3 = 120 g  
   b) What is the mass of 7 apples? \(7 \times 120\) g = 840 g

2. The mass of 5 boxes is 80 kg.  
   a) What is the mass of one box? \(80\) kg \(\div\) 5 = 16 kg  
   b) What is the mass of 3 boxes? \(3 \times 16\) kg = 48 kg

3. Complete:  
   a) \(1 \times 4 = 1000\) g \(\div\) 4 = 250 g  
   b) \(1 \times 8 = 1000\) g \(\div\) 8 = 125 g  
   c) \(1 \times 5 = 1000\) g \(\div\) 5 = 200 g  
   d) \(1.5 \times 3 = 1500\) g \(\div\) 3 = 500 g  
   e) \(1.8 \times 6 = 1800\) g \(\div\) 6 = 300 g  
   f) \(2.5 \times 2 = 2500\) g \(\div\) 2 = 1250 g

4. The mass of 3 pieces of wood is 1.5 kg.  
   a) What is the mass of 1 piece of wood? \(1500\) g \(\div\) 3 = 500 g  
   b) What is the mass of 2 pieces of wood? \(2 \times 500\) g = 1000 g = 1 kg

5. The mass of 5 bricks is 1 kg.  
   a) What is the mass of one brick? \(1000\) g \(\div\) 5 = 200 g  
   b) What is the mass of twelve bricks? \(12 \times 200\) g = 2400 g = 2.4 kg

6. The total mass of 8 items is one kg. \(1000\) g \(\div\) 8 = 125 g  
   What is the mass of 5 items? \(5 \times 125\) g = 625 g
Question 8 | Price per Kilogram

1. To work out a price involving mass we always want to know what one kilogram costs.
   
   Example: If it costs R45 for 3 kg of apples it means that it costs R15 for 1 kg of apples.
   
   We say: R15 per ONE kg.
   
   This price is calculated as follows: R45 ÷ 3 kg = R15/kg

2. Calculate the price, in Rand per kilogram, of each of the following items.
   
   a) R85 for 5 kg of sugar. R17/kg
      
      R85 ÷ 5 kg = R17/kg
   
   b) 9 kg of tomatoes cost R189. R21/kg
      
      R189 ÷ 9 kg = R21/kg
   
   c) R72 for 3 kg of flour. R24/kg
      
      R72 ÷ 3 kg = R24/kg
   
   d) 4 kg of mince costs R268. R67/kg
      
      R268 ÷ 4 kg = R67/kg

3. Neo buys 3 kg of beef for R342. a) What is the price per kilogram? R114/kg
   
   b) What will 5 kg of beef cost? R570

*4. Sam pays R300 for 4 kg of chicken. Price/kg = R300 ÷ 4 kg = R75/kg
   
   How much will 3 kg of chicken cost? R75/kg × 3 = R225

*5. Study the following examples of the different prices for items A, B and C:

   | Item A costs R36,90 for 3 kg. | Item B costs R17,50 for 2 kg. | Item C costs R32 for 5 kg. |
   | R36,90 ÷ 3 kg = R12,30/kg | R17,50 ÷ 2 kg = R8,75/kg | R32 ÷ 5 kg = R6,40/kg |

<table>
<thead>
<tr>
<th>R12,30</th>
<th>R8,75</th>
<th>R6,40</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>2</td>
<td>5</td>
</tr>
</tbody>
</table>

*6. Calculate the price, in Rand per kilogram, of each of the following items.

   a) R48,80 for 4 kg of sugar. R12,20/kg
      
      R48,80 ÷ 4 kg = R12,20/kg
   
   b) 2 kg of apples cost R45. R22,50/kg
      
      R45 ÷ 2 kg = R22,50/kg
   
   c) R37,50 for 2 kg of ice. R18,75/kg
      
      R37,50 ÷ 2 kg = R18,75/kg
   
   d) 5 kg of salt costs R124. R24,80/kg
      
      R124 ÷ 5 kg = R24,80/kg

7. Study the following example:

   If it costs R120 for 1 kg of meat, it costs R12 for 100 g of meat and it costs R60 for 500 g of meat and it costs R96 for 800 g of meat.

   R120 ÷ 10 = R12
   R120 ÷ 2 = R60
   R120 ÷ 5 = R96

   Remember: 1 kg = 1000 g 1/10 kg = 100 g 1/2 kg = 500 g 1/9 kg = 900 g etc.

8. If 1 kg of rice costs R48 what will 1/2 kg of rice cost? R48 ÷ 2 = R24 for 1/2 kg

9. If 1 kg of cheese costs R90 what will a) 100 g of cheese cost? R90 ÷ 10 = R9 for 100 g
   
   b) 300 g of cheese cost? R9 × 3 = R27 for 300 g
   
   c) 1/2 kg of cheese cost? R90 ÷ 2 = R45 for 500 g
   
   d) 900 g of cheese cost? R9 × 9 = R81 for 900 g
**Question 9 | Sharing and Dividing Mass**

1. Complete:
   
   \[
   \begin{align*}
   a) \quad & 1kg \div 4 = 1000g \div 4 = 250 g \\
   & \phantom{a)} 1kg \div 8 = 1000g \div 8 = 125 g \\
   & \phantom{a)} 1.25kg \div 5 = 1250g \div 5 = 250 g \\
   b) \quad & 1kg \div 5 = 1000g \div 5 = 200 g \\
   & \phantom{b)} 2kg \div 5 = 2000g \div 5 = 400 g \\
   & \phantom{b)} 2.75kg \div 5 = 2750g \div 5 = 550 g \\
   *c) \quad & 1,25kg \div 5 = 1250g \div 5 = 250 g \\
   *d) \quad & 2,75kg \div 5 = 2750g \div 5 = 550 g \\
   
   \end{align*}
   \]

2. 1kg of meat must be shared equally between 4 workers.
   How much meat must each worker get? \(1000g \div 4 = 250g\)

3. 2kg of washing powder must be shared equally between 2 women and 3 men. = 5 people
   How much washing powder must each person get? \(2000g \div 5 = 400g\)

4. Five people share 2¾ kg of flour equally. How much flour does each person get? \(2750g \div 5 = 550g\)

5. Complete:
   
   \[
   \begin{align*}
   a) \quad & 1000 \div 250 = 100 \div 25 = 4 \\
   & \phantom{a)} 2000 \div 250 = 200 \div 25 = 8 \\
   & \phantom{a)} 1000 \div 125 = 1000 \div 125 = 8 \\
   b) \quad & 2500 \div 250 = 250 \div 25 = 10 \\
   & \phantom{b)} 3500 \div 250 = 350 \div 25 = 14 \\
   c) \quad & 2000 \div 40 = 200 \div 4 = 50 \\
   & \phantom{c)} 2000 \div 80 = 200 \div 8 = 25 \\
   d) \quad & 2000 \div 125 = 200 \div 25 = 8 \\
   & \phantom{d)} 2000 \div 5 \div 25 = 400 \div 25 = 16 \\
   e) \quad & 1000 \div 125 = 1000 \div 5 \div 25 = 200 \div 25 = 8 \\
   
   \end{align*}
   \]

6. One packet holds 250g of sugar. How many packets can be filled from:
   
   a) 1kg of sugar? \(1000g \div 250g = 4 \text{ packets}\)
   b) 2kg of sugar? \(2000g \div 250g = 8 \text{ packets}\)
   c) 1,25kg of sugar? \(1250g \div 250g = 5 \text{ packets}\)
   d) 3,5kg of sugar? \(3500g \div 250g = 14 \text{ packets}\)

7.* How many packets, each holding 125g of beans, can be filled from a large bag containing 2kg of beans. \(2000g \div 125g = 16 \text{ packets can be filled}\)

8. How many bags of flour will have the same mass as the bag of sugar?
   
   2 bags \((5000g \div 2500g = 2 \text{ bags})\)

9. How many bags of flour will have the same mass as the bag of sugar?
   
   5 bags \((2500g \div 500g = 5 \text{ bags})\)

10. Consider the objects:

   a) How many butters will have the same mass as one bag of flour? \(4 \text{ tubes} (2000g \div 500g = 4)\)
   b) How many apples will have the same mass as one bag of flour? \(25 \text{ apples} (2000g \div 80g = 25)\)
   c) How many bars of soap will have the same mass as one butter? \(4 \text{ bars} (500g \div 125g = 4)\)
   d) How many bars of soap will have the same mass as one bag of flour? \(16 \text{ bars} (2000g \div 125g = 16)\)
Question 10  | Working with Tons

1. Study: Large masses are measured in tons. \(1 \text{ ton} = 1000 \text{ kilograms.}\)

An African Bush Elephant weighs approximately 6 tons (or 6000kg).

When changing:

a) tons to kilograms, **multiply** by 1000.  

b) kilograms to tons, **divide** by 1000.

<table>
<thead>
<tr>
<th>t</th>
<th>(\times) 1000</th>
<th>(\rightarrow) kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>(\times) 1000</td>
<td>(\rightarrow) 1000kg</td>
</tr>
</tbody>
</table>


<table>
<thead>
<tr>
<th>t</th>
<th>(\rightarrow) (\div) 1000</th>
<th>kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>(\rightarrow) (\div) 1000</td>
<td>(\rightarrow) 1ton</td>
</tr>
</tbody>
</table>

**Note:** "A small number tons of will give a large number of kilograms" and vice versa.

2. Complete.

a) \(4000 \text{ kg} = 4 \text{ t}\)

b) \(2500 \text{ kg} = 2,5 \text{ t}\)

c) \(9445 \text{ kg} = 9,445 \text{ t}\)

d) \(3040 \text{ kg} = 3,04 \text{ t}\)

e) \(17 \text{ kg} = 0,017 \text{ t}\)

f) \(1800 \text{ kg} = 1,8 \text{ t}\)

g) \(113 \text{ kg} = 0,113 \text{ t}\)

h) \(8 \text{ kg} = 0,008 \text{ t}\)

i) \(210 \text{ kg} = 0,21 \text{ t}\)

j) \(1080 \text{ kg} = 1,08 \text{ t}\)

k) \(63 \text{ kg} = 0,063 \text{ t}\)

l) \(30 \text{ kg} = 0,03 \text{ t}\)

3. Complete.

a) \(1,3 \text{ t} = 1300 \text{ kg}\)

b) \(3,21 \text{ t} = 3210 \text{ kg}\)

c) \(7 \text{ t} = 7000 \text{ kg}\)

d) \(5,02 \text{ t} = 5020 \text{ kg}\)

e) \(6,01 \text{ t} = 6010 \text{ kg}\)

f) \(0,557 \text{ t} = 557 \text{ kg}\)

g) \(3,11 \text{ t} = 3110 \text{ kg}\)

h) \(35 \text{ t} = 35000 \text{ kg}\)

i) \(0,003 \text{ t} = 3 \text{ kg}\)

j) \(0,06 \text{ t} = 60 \text{ kg}\)

k) \(4,005 \text{ t} = 4005 \text{ kg}\)

l) \(0,28 \text{ t} = 280 \text{ kg}\)

4. Complete:  
a) \(10 \text{ tons} = 10000 \text{ kg}\)  
\(10 \text{ t} \times 1000 = 10000 \text{ kg}\)

b) \(24500 \text{ kg} = 24,5 \text{ tons}\)  
\(24500 \text{ kg} \div 1000 = 24,5 \text{ t}\)

c) \(1 \text{ ton} = 1000000 \text{ grams}\)  
\(1 \text{ t} = 1000 \text{ kg}\)

Question 11  | Grams, Kilograms and Tons: Mixed Questions

1. Complete.

a) \(40 \text{ g} = 0,04 \text{ kg}\)

b) \(7 \text{ t} = 7000 \text{ kg}\)

c) \(2217 \text{ kg} = 2217 \text{ g}\)

\(2217 \text{ g} = 2217 \text{ kg}\)

d) \(465 \text{ kg} = 0,465 \text{ t}\)

\(465 \text{ kg} \div 1000 = 0,465 \text{ t}\)

e) \(0,35 \text{ t} = 350 \text{ kg}\)

f) \(10,08 \text{ t} = 10080 \text{ kg}\)

\(10080 \text{ kg} = 10,08 \text{ t}\)

g) \(8,04 \text{ t} = 8040 \text{ kg}\)

\(8040 \text{ kg} = 8,04 \text{ t}\)

h) \(15,2 \text{ kg} = 15200 \text{ g}\)

\(15200 \text{ g} = 15,2 \text{ kg}\)

i) \(900 \text{ kg} = 0,9 \text{ t}\)

j) \(6025 \text{ g} = 6,025 \text{ kg}\)

\(6025 \text{ g} = 6,025 \text{ kg}\)

k) \(0,003 \text{ kg} = 3 \text{ g}\)

\(0,003 \text{ kg} = 3 \text{ g}\)

l) \(0,085 \text{ kg} = 85 \text{ g}\)

\(0,085 \text{ kg} = 85 \text{ g}\)

2. Circle the correct answer in each.

2.1. \(15 \text{ kg} + 80 \text{ g} = \) ______

\(15000 \text{ g} + 80 \text{ g} = 15080 \text{ g} = 15,08 \text{ kg}\)

a) \(1580 \text{ g}\)

b) \(15,8 \text{ kg}\)

\(15,8 \text{ kg}\)

c) \(158 \text{ kg}\)

\(158 \text{ kg}\)

d) \(15,08 \text{ kg}\)

\(15,08 \text{ kg}\)

2.2. \(1 \text{ ton} - \frac{1}{2} \text{ kg} = \) ______

\(1000 \text{ kg} - \frac{1}{2} \text{ kg} = 999\frac{1}{2} \text{ kg}\)

a) \(9500 \text{ kg}\)

\(9500 \text{ kg}\)

b) \(999\frac{1}{2} \text{ kg}\)

\(999\frac{1}{2} \text{ kg}\)

c) \(99,5\frac{1}{2} \text{ kg}\)

\(99,5\frac{1}{2} \text{ kg}\)

d) \(95000 \text{ g}\)

\(95000 \text{ g}\)

2.3. \(\frac{3}{4} \text{ of } 2 \text{ kg} = \) ______

\(\frac{3}{4} \text{ of } 2000 \text{ g} = 1500 \text{ g}\)

a) \(342 \text{ g}\)

\(342 \text{ g}\)

b) \(1\frac{1}{2} \text{ kg}\)

\(1\frac{1}{2} \text{ kg}\)

c) \(150 \text{ g}\)

\(150 \text{ g}\)

d) \(2340 \text{ g}\)

\(2340 \text{ g}\)
2.4. 1 ton = ______ 
   a) 100 kg    b) 1 000 000 g    c) 10 000 g    d) 100 000 kg

2.5. 0,08 kg + 0,1 kg + 70 kg = ______
   a) 70,18 kg  b) 817 kg  c) 70 801 g  d) 7,18 kg

**Question 12 | Scales**

1. Write down the reading from each 1kg scale below.
   a) 300g
   b) 900g
   c) 200g
   d)* 750g

2. Draw an arrow to indicate the given amounts on each scale.
   a) 0,5 kg
   b) 200g
   c) 0,7 kg
   d)* ¼ kg (250g)

3. Write down the reading from each 5kg scale below.
   a) 2,5 kg
   b) 300 g
   c) 3,3 kg
   d)* 4 kg 900 g

4. Draw an arrow to indicate the given amounts on each scale.
   a) 0,8 kg
   b) 2 ½ kg
   c) 3,8 kg
   d)* $\frac{41}{5}$ kg = 4200g
Section 2: Whole Numbers

Question 1  |  Value and Place Value

1. Study: The number below is said, “520 million, 437 thousand, 816”.

<table>
<thead>
<tr>
<th>HM</th>
<th>TM</th>
<th>M</th>
<th>HTh</th>
<th>TTh</th>
<th>Th</th>
<th>H</th>
<th>T</th>
<th>U</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>2</td>
<td>0</td>
<td>4</td>
<td>3</td>
<td>7</td>
<td>8</td>
<td>1</td>
<td>6</td>
</tr>
</tbody>
</table>

2. Write down the value of each underlined digit.
   a) 18 532 790  
   b) 79 527 182  
   c) 856 470 325  
   d) 632 013 820  
   e) 537 762 839  
   f) 914 155 361

3. Write down the place value of each underlined digit.
   a) 72 098 751  
   b) 27 197 125  
   c) 38 262 308  
   d) 728 900 623  
   e) 758 179 340  
   f) 522 604 503

4. Complete:
   a) Seventy three million, two hundred and five thousand and six is written 73 205 006.
   b) Eighteen million, three hundred and fifty thousand and ten is written 18 350 010.
   c) Forty four million, nine hundred thousand, six hundred and twelve is written 44 900 612.
   d) Three hundred and twenty million, six hundred and eleven thousand is written 320 611 000.

5. In the number 986 947 521:
   a) The place value of the 6 is Millions.
   b) The value of the 8 plus the value of the 7 is 80 000 000 + 7 000 = 80 007 000.
   c) The value of the 9 on the left is 1000 times the value of the 9 on the right.

6. Use the following digits to make the:
   a) biggest odd number.  9 754 201 (must end on the 1)
   b) smallest even number.  1 024 796 (must end on the 6)

Question 2  |  Exponential Notation

1. We use exponential notation to write very big numbers.
   a) 1 million  = 1 000 000  
   = 10 × 10 × 10 × 10 × 10 × 10  
   = 10^6  

   b) 3 million  = 3 000 000  
   = 3 × 10 × 10 × 10 × 10 × 10 × 10  
   = 3 × 10^6

   c) 10 million = 10 000 000  
   = 10 × 10 × 10 × 10 × 10 × 10 × 10  
   = 10^7

   d) 500 million = 500 000 000  
   = 5 × 10 × 10 × 10 × 10 × 10 × 10 × 10  
   = 5 × 10^8

2. Complete:  
   a) 2 × 10^6 = 2 000 000
   b) 10^7 = 10 × 10 × 10 × 10 × 10 × 10 × 10
   c) 5 × 10^7 = 50 000 000
   d) 3 × 10^5 = 3 × 10 × 10 × 10 × 10 × 10
   e) 4 × 10^8 = 400 000 000
   f) 8 × 10^4 = 8 × 10 × 10 × 10 × 10
Question 3 | Short Form and Expanded Form

1. Write in short form.
   a) \(5 000 000 + 200 000 + 80 000 + 5000 + 400 + 7 = 5285407\)
   b) \(3HTh + 6Th + 2H + 5TTh + 6T + 4M = 4356260\)
   c) \(3 \times 1000 + 6 \times 1000000 + 5 \times 100 + 4 \times 1 + 8 \times 100000 = 60803504\)

2. Study the place value columns:

<table>
<thead>
<tr>
<th>HM</th>
<th>TM</th>
<th>M</th>
<th>HTh</th>
<th>TTh</th>
<th>Th</th>
<th>H</th>
<th>T</th>
<th>U</th>
</tr>
</thead>
<tbody>
<tr>
<td>(10^9)</td>
<td>(10^8)</td>
<td>(10^7)</td>
<td>(10^6)</td>
<td>(10^5)</td>
<td>(10^4)</td>
<td>(10^3)</td>
<td>(10^2)</td>
<td>(10^1)</td>
</tr>
<tr>
<td>10</td>
<td>8</td>
<td>10</td>
<td>7</td>
<td>10</td>
<td>6</td>
<td>5</td>
<td>4</td>
<td>3</td>
</tr>
</tbody>
</table>

3. Complete to write each of the following numbers in expanded form.
   a) \(409623 = 400 000 + 9000 + 600 + 20 + 3\)
   b) \(582703 = 5HTh + 8TTh + 2Th + 7H + 3U\)
   c) \(604038 = 6 \times 100 000 + 4 \times 1000 + 3 \times 10 + 8\)
   d) \(859040 = 8 \times 10^5 + 5 \times 10^4 + 9 \times 10^3 + 4 \times 10^2 + 0 \times 10 + 4\)
   e) \(9432127 = 9 \times 10^6 + 4 \times 10^5 + 3 \times 10^4 + 2 \times 10^3 + 1 \times 10^2 + 2 \times 10^1 + 7\)
   f) \(85179346 = 8 \times 10^7 + 5 \times 10^6 + 1 \times 10^5 + 7 \times 10^4 + 9 \times 10^3 + 3 \times 10^2 + 4 \times 10 + 6\)

4. Write in short form.
   a) \(5 \times 10^6 + 4 \times 10^5 + 6 \times 10^4 + 1 \times 10^3 + 8 \times 10^2 + 2 \times 10 + 6 = 5461826\)
   b) \(7 \times 10^6 + 9 \times 10^5 + 2 \times 10^3 + 6 \times 10^2 + 9 \times 10 + 3 = 7902693\)
   c) \(6 \times 10^8 + 2 \times 10^7 + 9 \times 10^5 + 1 \times 10^4 + 3 \times 10 + 5 = 62091035\)
   d) \(5 \times 10^5 + 6 \times 10 + 7 \times 10^8 + 3 \times 10^6 + 8 \times 10^4 = 703580360\)

Question 4 | “More than” and “Less Than”

1. In the number:
   a) \(2354163\) there are 2 millions, 23 hundred thousands or 2354 thousands.
   b) \(57932085\) there are 57 millions, 579 hundred thousands or 57932 thousands.
   c) \(784350411\) there are 784 millions, 7843 hundred thousands or 784350 thousands.

2. The number which is:
   a) 3 M more than \(28514360\) is \(31514360\).
   b) 6 M less than \(41745939\) is \(35745939\).
   c) 4 HTh more than \(3695836\) is \(4095836\).
   d) 5 HTh less than \(5364018\) is \(4864018\).
   e) 8 TTh less than \(4109472\) is \(4029472\).
   f) 15 M less than \(324651787\) is \(174651787\).

3. Complete: a) What number is 7 M more than 8 529 304? \(15529304\)
   b) What number is 2 M more than 359 456 309? \(361456309\)
   c) What number is 50 M less than 132 609 277? \(82609277\)
   d) What number is 1 HTh more than 5 916 546? \(6016546\)
   e) What number is 8 HTh less than 25 702 778? \(24902778\)
Question 5 | Rounding Off

1. Complete:
   a) In 3 258 714 there are 3,258 thousands, 325,870 hundreds or 325,871 tens.
   b) In 6 943 825 there are 6,943 thousands, 694,380 hundreds or 694,382 tens.
   c) In 42 354 862 there are 42,354 tens thousands or 4,235,480 hundreds.

2. Complete:

<table>
<thead>
<tr>
<th>Number</th>
<th>Rounded off to the nearest 10</th>
<th>100</th>
<th>1000</th>
<th>10 000</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) 539 457</td>
<td>539 460</td>
<td>539 500</td>
<td>539 000</td>
<td>540 000</td>
</tr>
<tr>
<td>b) 3 652 893</td>
<td>3 652 890</td>
<td>3 652 900</td>
<td>3 653 000</td>
<td>3 650 000</td>
</tr>
<tr>
<td>c) 76 836 268</td>
<td>76 836 270</td>
<td>76 836 300</td>
<td>76 836 000</td>
<td>76 840 000</td>
</tr>
</tbody>
</table>

3. Round each number off to the nearest 5.
   Hint: 10 11 12 | 13 14 15 16 17 18 19 20
   a) 184 ≈ 185
   b) 46 947 ≈ 46 945
   c) 278 132 ≈ 278 130
   d) 6 494 746 ≈ 6 494 745

*4. Complete:
   a) 46 896 ≈ 46 900 rounded off to the nearest 10.
   b) 2 758 629 ≈ 3 000 000 rounded off to the nearest million.
   c) 47 819 623 ≈ 47 820 000 rounded off to the nearest 1000.
   d) 38 597 ≈ 38 595 rounded off to the nearest 5.

Question 6 | Comparing Numbers

1. Insert the symbol > , < or = between each pair of numbers.
   a) 6 776 678 > 6 767 678
   b) 10^7 = 10 000 000
   c) 206 084 071 < 206 408 701
   d) 5 × 10^6 > 500 000
   e) 30 × 100 × 1000 < 30 000 000
   f) 9 × 10^4 < 4 × 10^5
   g) 3 × 10^5 + 4 × 10^6 > 340 000
   h) 750 000 000 > 7 × 10^8 + 5 × 10^6

Question 7 | Prime Numbers and Composite Numbers

1. Study:
   A prime number is a number that only has 2 factors, itself and 1.
   Examples: 5 , 13 , 29
   A composite number is a number that has more than 2 factors.
   Examples: 6 , 15 , 32

2. Write down the factors of each number.
   Mark the prime numbers with a "P" and the composite numbers with a "C".
   a) 1: ____________________________ b) 2: 1 , 2 P c) 8: 1 , 2 , 4 , 8 C
   d) 15: 1 , 3 , 5 , 15 C e) 29: 1 , 29 P f) 99: 1 , 3 , 33 , 99 C

3. Complete:
   a) The smallest 1-digit prime number is 2.
   b) The largest 2-digit prime number is 97.
   c) The prime numbers between 20 and 40 are 23 , 29 , 31 , 37.
Section 3: Addition and Subtraction

Question 1 | Rounding Off (Revision)

1. Complete:

<table>
<thead>
<tr>
<th>Number</th>
<th>Rounded off to the nearest</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>10</td>
</tr>
<tr>
<td>a) 19 672</td>
<td>19 670</td>
</tr>
<tr>
<td>b) 834 149</td>
<td>834 150</td>
</tr>
<tr>
<td>c) 8 586 295</td>
<td>8 586 300</td>
</tr>
</tbody>
</table>

Question 2 | Estimation (to the nearest 1 000 and 10 000)

1. Round the numbers off to the nearest 1 000 to estimate the answers.

   a) \(42 956 + 65 125\) ≈ \(43 000 + 65 000\) ≈ \(108 000\)

   b) \(57 509 + 92 488\) ≈ \(58 000 + 92 000\) ≈ \(150 000\)

   c) \(98 396 - 84 913\) ≈ \(98 000 - 85 000\) ≈ \(13 000\)

   d) \(32 438 + 8 225 + 15 629\) ≈ \(32 000 + 8 000 + 16 000\) ≈ \(76 000\)

   e) \(152 843 + 9 825 + 16 845\) ≈ \(153 000 + 10 000 + 17 000\) ≈ \(180 000\)

2. Round the numbers off to the nearest 10 000 to estimate the answers.

   a) \(242 567 + 679 124\) ≈ \(240 000 + 680 000\) ≈ \(920 000\)

   b) \(123 577 + 96 248\) ≈ \(120 000 + 100 000\) ≈ \(220 000\)

   *c) \(498 572 - 263 486\) ≈ \(500 000 - 260 000\) ≈ \(240 000\)

   d) \(32 758 + 88 252 + 57 692\) ≈ \(30 000 + 90 000 + 60 000\) ≈ \(180 000\)

   e) \(682 906 - 247 235 - 95 449\) ≈ \(680 000 - 250 000 - 100 000\) ≈ \(330 000\)

Question 3 | Addition and Subtraction (up to 9-digit numbers)

1. Complete:

   Example:

   \[\begin{array}{c}
   1 \\
   1 \\
   1 \\
   1
   \end{array}
   \begin{array}{c}
   585324 \\
   +2679738 \\
   \hline
   3265062
   \end{array}\]

   a) \(87 483 + 69 247\) = \(156 730\)

   b) \(294 718 + 85 264\) = \(379 982\)

   c) \(583 281 + 495 838\) = \(1 079 119\)

   d) \(3 248 703 + 407 978\) = \(3 656 681\)

2. Complete:

   Example:

   \[\begin{array}{c}
   8 \\
   14 \\
   7 \\
   9 \\
   10
   \end{array}
   \begin{array}{c}
   9 \\
   4 \\
   7 \\
   8 \\
   9 \\
   9
   \end{array}
   \begin{array}{c}
   6 \\
   9 \\
   3 \\
   5 \\
   6 \\
   2
   \end{array}
   \begin{array}{c}
   2 \\
   5 \\
   4 \\
   2 \\
   3 \\
   8
   \end{array}\]

   a) \(57 928 - 18 286\) = \(39 642\)

   b) \(80 000 - 52 675\) = \(27 325\)

   *c) \(735 806 - 268 349\) = \(467 457\)

   d) \(23 529 786 - 9 848 832\) = \(13 680 954\)

3. Complete: [Mixed questions]

   a) \(23 687 233 + 8 938 784\) = \(32 626 017\)

   b) \(1 000 000 - 86 549\) = \(913 451\)

   c) \(3 900 000 + 199 856\) = \(4 099 856\)

   d) \(6 500 000 - 3 750 225\) = \(2 749 775\)
**Question 4 | Inverse Operations**

1. Use inverse operations to calculate the missing numbers in each.
   
   a) $80 + 70 = 150$  
      $150 - 70 = 80$
   
   b) $210 - 60 = 150$  
      $150 + 60 = 210$
   
   c) $95 + 35 = 130$  
      $130 - 35 = 95$
   
   d) $158 - 78 = 80$  
      $158 - 80 = 78$
   
   e) $135 + 115 = 250$  
      $250 - 135 = 115$
   
   f) $136 - 78 = 58$  
      $136 - 58 = 78$
   
   g) $128 + 72 = 200$  
      $200 - 72 = 128$
   
   h) $389 - 124 = 265$  
      $124 + 265 = 389$

2.* Use inverse operations to calculate the missing numbers in each.
   
   a) $283 974 + 421 969 = 705 943$  
      $705 943 - 283 974 = 421 969$
   
   b) $3 500 000 - 3 253 957 = 5 246 043$  
      $5 246 043 + 3 253 957 = 8 500 000$

3.* Complete:
   
   a) What must be added to 89 576 to get 125 000? $125 000 - 89 576 = 35 424$
   
   b) What must be added to 3 765 000 to get 5 million? $5 000 000 - 3 765 000 = 1 235 000$

4. Fill in the missing digits in each of the following sums.
   
   a) $2 8 7 9 6$  
      $+ 5 2 6 3 5$  
      $8 1 4 3 1$
   
   b) $8 6 7 5 8$  
      $- 2 9 4 7 3$  
      $5 7 2 8 5$
   
   c) $1 9 4 9 5 3$  
      $+ 8 2 7 3 0 1$  
      $5 7 2 8 5$

**Question 5 | Adding three numbers**

1. Complete.
   
   Example: $625 8175$  
   $875 587$  
   $+ 917 225$  
   $805 0987$
   
   a) $32 438 + 18 252 + 9 631 = 60 321$
   
   b) $84 506 + 36 348 + 95 175 = 216 029$
   
   c) $631 829 + 128 387 + 48 230 = 808 446$
   
   d) $9 347 176 + 851 692 + 3 345 507 = 13 544 375$

**Question 6 | “More than”, “Less than”, “Sum” and “Difference”**

1. Complete:
   
   a) How much more is 75 000 000 than 69 000 000? $75 000 000 - 69 000 000 = 6 000 000$
   
   b) How much less is 578 295 than 1 325 887? $1 325 887 - 578 295 = 747 592$

2. The difference between two numbers is 459 376. The smaller number is 240 624. What is the bigger number? $240 624 + 459 376 = 700 000$

3. The sum of three numbers is 637 803. Two of the numbers are 176 407 and 298 845. Find the third number.
   
   a) $176 407 + 298 845 = 475 252$  
      $+ 475 252 = 637 803$  
      $637 803 - 475 252 = 162 551$
4. Complete: Hint: Consecutive means “following each other continuously”.
   a) The sum of two consecutive numbers is 13. The two numbers are 6 and 7.  
   b) The sum of two consecutive numbers is 23. The two numbers are 11 and 12.  
   c) The sum of two consecutive numbers is 145. The two numbers are 72 and 73.

5. Complete:
   a) The sum of three consecutive numbers is 24. The three numbers are 7, 8 and 9. 
   b) The sum of three consecutive numbers is 45. The three numbers are 14, 15 and 16.  
   c) The sum of three consecutive numbers is 126. The three numbers are 41, 42 and 43.

6. The sum of two consecutive numbers is 691. What are the two numbers?  
   A 600 and 91    B 690 and 1    C 345 and 346    D A, B and C

7. True or False? The difference between two consecutive numbers will always be 1. True

---

**Question 7 | Adding and/or subtracting three numbers**

1. Complete. If there is only + and / or – in a number sentence, complete it from left to right, in the order it's been given.

   a) \[16 + 24 - 17\]  
      \[= 40 - 17\]  
      \[= 23\]

   b) \[89 - 65 + 39\]  
      \[= 24 + 39\]  
      \[= 63\]

   c) \[100 - 85 + 96\]  
      \[= 15 + 96\]  
      \[= 111\]

   d) \[123 + 87 - 18\]  
      \[= 210 - 18\]  
      \[= 192\]

2. Complete.

   a) \[7 1857 + 9398\]  
      \[= 81255\]

   b) \[90000 - 64792\]  
      \[= 25208\]

   c) \[126578 - 96497\]  
      \[= 30081\]

   d) \[1258698 + 39872260\]  
      \[= 52457958\]

3. Calculate. Do your working out on a separate piece of paper.

   a) \[582367 - 381286 + 497508\]  
      \[= 201081 + 497508\]  
      \[= 698589\]

   b) \[6238947 + 369053 - 1250000\]  
      \[= 6608000 - 1250000\]  
      \[= 5358000\]

4. Write a number sentence for each word problem and then find the answer for each.

   a) Add 9 to the difference between 12 and 7. \[(12 - 7) + 9 = 5 + 9 = 14\]

   b) Add 15 to the difference between 8 and 20. \[(20 - 8) + 15 = 12 + 15 = 27\]

   c) Subtract 8 from the sum of 6 and 9. \[(6 + 9) - 8 = 15 - 8 = 7\]

   d) Subtract 25 from the sum of 84 and 26. \[(84 + 26) - 25 = 110 - 25 = 85\]

   *e) Add 38000 to the difference between 89500 and 16750. \[(89500 - 16750) + 38000\]  
      \[= 72750 + 38000\]  
      \[= 110750\]

   *f) Subtract 75000 from the sum of 2M and 3M. \[(200000 + 3000000) - 750000 = 500000 - 75000 = 4250000\]
1. Circle the correct answer in each.
   1.1. 340g = ______
       a) 3.4kg  b) 0.034kg  c) ¾ kg  d) 0.34kg
   1.2. 12 tons = ______
       a) 1200 kg  b) 12 000 kg  c) 120 000g  d) 1,2000 kg
   1.3. The sum of two consecutive numbers is 275. What are the two numbers?
       a) 200 and 75  b) 137 and 138  c) 190 and 85  d) a, b and c

2. Complete:
   a) The smallest 2-digit prime number is 11.
   b) The composite numbers between 35 and 45 are 36, 38, 39, 40, 42, 44.
   c) 8 647 ÷ 6 rounded off to the nearest 5.
   d) 19 621 354 ÷ 50 000 000 rounded off to the nearest million.
   e) A cube has 6 identical square faces. True  False
   f) 4 × 10^5 + 9 × 10 + 3 × 10^3 + 5 × 10^7 + 8 × 10^4 = 50 480 390 in short form.
   g) Subtract 259 from the sum of 740 and 260. (740 + 260) – 259 = 741

3. Consider the number 60 740 503.
   a) Write in words. Sixty million, seven hundred and forty thousand, five hundred and three.
   b) The sum of the values of the 6 and 4 is 60 000 000 + 40 000 = 60 040 000.

4. Calculate.
   a) 582 300 – 418 286 + 95 768
      = 164 014 + 95 768
      = 259 782
   b) ⅗ of 2⅓kg
      = ⅗ of 2500g = 1500g

5. Insert >, < or =.
   a) 1kg of sand = 1kg of sawdust
   b) 5 × 10^6 > 6 × 10^6
   c) 3 × 10^4 + 4 × 10^3 < 340 000
   d) 0.08kg < 800g

6. 1 745 326 people live in Townsville.
   a) How many people must move to Townsville to make the total population 2 million?
      2 000 000 – 1 745 326 = 254 674
   b) How many people must move away to make the total population 1 739 326?
      1 745 326 – 1 739 326 = 6 000

7. Jaco bought 2⅓ kg of bananas, 5kg 800g of meat and 95g of sweets.
   Calculate the total mass of the goods in kg.
   2.25kg + 5.8 kg + 0.095kg = 8.145 kg

8. If 1 kg of cheese costs R120 what will 0.6kg of cheese cost?
   Cost for 100g of cheese = R120 ÷ 10 = R12
   Cost for 600g of cheese = R12 × 6 = R72

9. How many 125g sugar sachets can be filled from a 1kg bag of sugar?
   1000g ÷ 125g = 1000 ÷ 5 ÷ 25 = 200 ÷ 25 = 8
   8 sachets can be filled
Section 4: Viewing Objects

Question 1 | Views

1. Study the given views of the shaded figure.

![Shaded Figure](image)

Side View | Front View | Top View
--- | --- | ---
[Diagram of Side View] | [Diagram of Front View] | [Diagram of Top View]

Take note of the “front” and the “side” of the figure.

2. Draw the view of each object as indicated. Take note of the “front” and the “side” labels.

a) ![Diagram of Object a](image)

Front view

Side view

b) ![Diagram of Object b](image)

Front view

Side view

c) ![Diagram of Object c](image)

Front view

Side view

d) ![Diagram of Object d](image)

Front view

Top view
Question 2  Views from the Back

1. Study the given views of the shaded figure:

[Diagram of a 3D figure with front and back views]

Note: The object is seen as facing the opposite direction when viewing it from the back.

2. Draw the view of each object as indicated.

   a)

   b)

Question 3  Views

1. Draw the views of the armchair below.

   [Diagram of an armchair with front, side, and top views]

2. Draw the views of the couch below.

   [Diagram of a couch with front, side, and top views]
Question 4  |  Views

1. Which view of each object is drawn in the blocks?

   a) [Chair side view]
   b) [Cup front view]
   c) [Block top view]

2. Which 2-D shape below shows the back view of the 3-D object?

   A  B  C

3.* From which side did Sizwe take the photograph of the couch shown here:

4. Complete the table for the object:

<table>
<thead>
<tr>
<th>Side view</th>
<th>Front view</th>
<th>Top view</th>
<th>*Back view</th>
</tr>
</thead>
<tbody>
<tr>
<td>[Side view]</td>
<td>[Front view]</td>
<td>[Top view]</td>
<td>[Back view]</td>
</tr>
</tbody>
</table>

   [Diagram of a couch with views highlighted]
**Section 5: Properties of 2-D Shapes**

### Question 1 | Regular and Irregular Polygons

1. **Complete:** Polygons are named according to their number of [sides].

2. **Describe the difference between regular and irregular polygons.**
   - **Regular polygons:** All sides are equal in length and all angles are equal in size.
   - **Irregular polygons:** The sides and angles are not equal in length/size.

3. **Explain why a rectangle is an irregular polygon.** All of its sides are not equal in length.

4. **True or False?**
   - a) A cube is a polygon. **False. Polygons are 2-D.**
   - b) A circle is a polygon. **False. Polygons have straight sides.**


6. **Complete:**
   - a) A polygon with 7 straight sides is called a [heptagon](https://en.wikipedia.org/wiki/Heptagon).
   - b) A nonagon has 9 straight sides.
   - c) A polygon with 10 straight sides is called a [decagon](https://en.wikipedia.org/wiki/Decagon).
   - d) A hexagon has 6 straight sides.

7. **Name each polygon below. Which polygons are irregular?** b, d, f, g, and h.

   ![Polygons](https://example.com/polygons.png)

   **a)** Heptagon  **b)** Hexagon  **c)** Pentagon  **d)** Heptagon

   **e)** Octagon  **f)** Pentagon  **g)** Octagon  **h)** Nonagon

### Question 2 | Parallel Lines

1. **Study:** Parallel lines are lines that stay the same distance apart over their entire length. No matter how far you extend parallel lines, they will never meet.

   We use arrowheads (>) or (>>) to show that lines are parallel to one another:

   **NB:** Parallel lines can be different lengths.

2. **True or False?**
   - a) Parallel lines will never meet. **True**
   - b) Parallel lines must be the same length. **False**

3. **Which pairs of lines are parallel?**

   ![Parallel Lines](https://example.com/parallel_lines.png)

   **A**  **B**  **C**  **D**  **E**  **F**
**Question 3 | Squares and Rectangles**

1. Study:  
   - A square has **4** equal sides.  
   - A rectangle has 2 pairs of equal sides.  

   ![Square and Rectangle Diagrams]

   - 2 widths = 1 pair of equal sides  
   - 2 lengths = 1 pair of equal sides

2. On the grid, draw a square with sides of 3 units each.  

3. On the grid, draw a rectangle with a width of 3 units and a length of 8 units.

4. Complete:  
   a) Mark the equal sides on the square above using small dashes ( | ).  
   b) Mark the equal sides on the rectangle above using small dashes ( | or || ).

5. Mark the parallel sides on the rectangle and square below, using arrows (> and >>).

   a) AB is parallel to CD  
   b) PQ is parallel to SR  
   c) DF is parallel to EG

6. Study:  
   - Parallel sides come in pairs and are always opposite one another.  
   a) A square has 2 pairs of parallel sides.  
   b) A rectangle has 2 pairs of parallel sides.

7. Complete the table by naming each shape and then filling in:

<table>
<thead>
<tr>
<th>Shape</th>
<th>Name</th>
<th>Number of equal sides</th>
<th>Number of parallel sides</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Square</td>
<td>4</td>
<td>2 pairs</td>
</tr>
<tr>
<td></td>
<td>Rectangle</td>
<td>2 pairs</td>
<td>2 pairs</td>
</tr>
</tbody>
</table>

Term 3 | Section 5 | Properties of 2-D Shapes  
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Question 4 | Rhombus and Parallelogram

1. Study:  a) A rhombus looks like a pushed over square. Just like a square, it has:
   - 4 equal sides.
   - 2 pairs of parallel sides.

   b) A parallelogram looks like a pushed over rectangle. Just like a rectangle, it has:
   - 2 pairs of equal sides.
   - 2 pairs of parallel sides.

2. On the grid, draw a rhombus with sides of 3 units each.

3. On the grid, draw a parallelogram with a width of 3 units and a length of 6 units.

4. Complete:  a) Mark the equal sides on the parallelogram above using small dashes ( | or || ).
   b) Mark the parallel sides on the rhombus above using arrow heads ( > or >> ).

5. Complete the table:

<table>
<thead>
<tr>
<th>Name</th>
<th>Number of equal sides</th>
<th>Number of parallel sides</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rhombus</td>
<td>4</td>
<td>2 pairs</td>
</tr>
<tr>
<td>Parallelogram</td>
<td>2 pairs</td>
<td>2 pairs</td>
</tr>
</tbody>
</table>

Question 5 | Trapezium and Kite

1. Study:  a) A trapezium has 4 straight sides therefore it is a special quadrilateral. It has one pair of parallel sides.

   Examples:

   Remember: Parallel sides are always opposite one another.

   b) A kite has 4 straight sides therefore it is a special quadrilateral. It has:
   - 2 short sides that join at a one corner.
   - 2 long sides that join at the opposite corner.

2. Mark the parallel sides on the trapeziums.

3. Mark the equal sides on the kites.

   b) A trapezium has one pair of parallel sides.
Question 6 | Quadrilaterals: Mixed Questions

1. Name each quadrilateral below.
   a) Parallelogram
   b) Rectangle
   c) Square
   d) Trapezium
   e) Trapezium
   f) Trapezium
   g) Kite
   h) Rhombus (not a kite)

2.* Complete each sentence.
   a) A square has four equal sides.
   b) A rectangle has 2 pairs of parallel sides.
   c) A parallelogram has opposite sides of equal length.
   d) A kite has no / zero parallel sides.

Question 7 | Acute, Right, Obtuse and Straight Angles

1. Study the names and sizes of the angles.

   **Acute angle**
   - Smaller than a right angle
   - $0^\circ < \text{Acute angle} < 90^\circ$

   **Right angle**
   - $90^\circ = \text{Right angle}$
   - Right angle = $90^\circ$

   **Obtuse angle**
   - Larger than a right angle but smaller than a straight angle
   - $90^\circ < \text{Obtuse angle} < 180^\circ$

   **Straight Angle**
   - Equal to 2 right angles
   - $180^\circ = \text{Straight angle}$

2. Write down which kind of angle is shown in each of the following diagrams.

   a) Obtuse Angle
   b) Straight Angle
   c) Acute Angle
   d) Right Angle
   e) Acute Angle
   f) Obtuse Angle

3. True or False?
   a) An acute angle is smaller than a right angle. **True**
   b) When 2 lines form a right angle, the lines are perpendicular to one another. **True**
   c) A straight angle is equal to 2 right angles. **True**
   d) An obtuse angle is greater than a straight angle but smaller than a right angle. **False**
Question 8 | Reflex Angles and Revolutions

1. Study the names of the angles below.

<table>
<thead>
<tr>
<th>Angle Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Straight Angle</td>
<td>Equal to 2 right angles</td>
</tr>
<tr>
<td>Reflex Angle</td>
<td>Larger than a straight angle but smaller than a revolution.</td>
</tr>
<tr>
<td>Revolution</td>
<td>A full turn.</td>
</tr>
</tbody>
</table>

2. Write down which kind of angle is shown in each of the following diagrams.

<table>
<thead>
<tr>
<th>Diagram</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>a)</td>
<td>Revolution</td>
</tr>
<tr>
<td>b)</td>
<td>Reflex Angle</td>
</tr>
<tr>
<td>c)</td>
<td>Reflex Angle</td>
</tr>
</tbody>
</table>

3. True or False?  
   a) A reflex angle can be greater than a revolution.  False  
   b) A revolution is equal to 4 right angles.  True

Question 9 | Angles in Polygons

1. Mark the right angles in the square and the rectangle.  
   a)  
   b)  

2. Complete:  
   a) A square has four right angles.  
   b) A rectangle has four right angles.  

3. Study how the angles in a trapezium and parallelogram are marked.

<table>
<thead>
<tr>
<th>Angle Type</th>
<th>Diagram</th>
</tr>
</thead>
<tbody>
<tr>
<td>Right angle</td>
<td>Trapezium</td>
</tr>
<tr>
<td>Obtuse angle</td>
<td>Parallelogram</td>
</tr>
<tr>
<td>Acute angle</td>
<td></td>
</tr>
</tbody>
</table>

4. In the rhombus, mark the acute angles with a single arc and the obtuse angles with a double arc.

5. Complete:  
   a) Is it possible to draw a parallelogram with one right angle? No  
   b) Is it possible to draw a square which has an obtuse angle? No

6. Identify the types of angles below.

<table>
<thead>
<tr>
<th>Angle Type</th>
<th>Diagram</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Right angle</td>
<td>a)</td>
</tr>
<tr>
<td>2. Acute angle</td>
<td>b)</td>
</tr>
<tr>
<td>1. Reflex angle</td>
<td>c)</td>
</tr>
<tr>
<td>2. Acute angle</td>
<td>d)</td>
</tr>
<tr>
<td>1. Acute angle</td>
<td></td>
</tr>
<tr>
<td>2. Obtuse angle</td>
<td></td>
</tr>
<tr>
<td>1. Reflex angle</td>
<td></td>
</tr>
<tr>
<td>2. Acute angle</td>
<td></td>
</tr>
</tbody>
</table>
**Question 10 | Angles in Everyday Life**

1. Which kind of angles are shown in each of the following?
   a) Reflex Angle
   b) Obtuse Angle
   c) Right Angle

**Question 11 | Mixed Questions**

1. Complete the table.

<table>
<thead>
<tr>
<th>Shape</th>
<th>Name</th>
<th>Number of right angles</th>
<th>Number of equal sides</th>
<th>Number of parallel sides</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Rhombus</td>
<td>0</td>
<td>4</td>
<td>2 pairs</td>
</tr>
<tr>
<td></td>
<td>Rectangle</td>
<td>4</td>
<td>(2 lengths, 2 widths)</td>
<td>2 pairs</td>
</tr>
<tr>
<td></td>
<td>Kite</td>
<td>0</td>
<td>2 pairs</td>
<td>(2 short sides, 2 long sides)</td>
</tr>
</tbody>
</table>

2. Use a pencil and ruler to draw each of the following shapes on separate grid paper.

   a) A triangle with one right angle.
   b) A quadrilateral with one angle bigger than a right angle.
   c) A trapezium with no right angles.
   d) An irregular pentagon.
   e)* A quadrilateral in which all 4 sides are equal and none of the angles are right angles. What is this quadrilateral called? Rhombus

3. Is it possible to draw each of the following 2-D shapes?
   a) A triangle with 4 angles. No, all triangles have 3 angles.
   b) A rhombus with one right angle. No
   c) A parallelogram with opposite sides that are not parallel. No, opposite sides must be parallel.

4. Complete each sentence.
   a) A rectangle has 2 pairs of parallel sides.
   b) A rhombus has zero right angles.
   c) The opposite sides of a parallelogram are equal in length.
   d) A square has four equal sides and four right angles.
1. Study: A circle is a round figure. Its boundary consists of points which are the same distance from a fixed point, called the **centre** of the circle.

2. True or False?  
   a) A circle is a round figure. **True**
   b) A circle is a 3-D object. **False**  
   c) This is the centre of the circle. **False**
   d) The points on the boundary of a circle can be different distances from its centre. **False**

3. Study:  
   a) **Circumference**: The distance around the outside of a circle.  
   b) **Radius**: A straight line from the centre of a circle to its boundary.  
      *Radii is the plural of radius.*
   c) **Diameter**: A straight line passing from side to side through the centre of a circle.

4. Complete:  
   a) The distance around a circle is the **circumference**.  
   b) A straight line passing from side to side through the centre of a circle is the **diameter**.  
   c) Draw a diameter on the circle in green.
   d) The radius is a straight line from the **centre** of a circle to its **boundary**.
   e) Draw a radius on the circle in blue.

5. Calculate the radius (r) of a circle if the diameter is:  
   a) 8 cm  $r = 4\text{ cm}$  
   b) 10 cm  $r = 5\text{ cm}$  
   c) 12 cm  $r = 6\text{ cm}$  
   d) 24 mm  $r = 12\text{ mm}$  
   e) 36 mm  $r = 18\text{ mm}$  
   f) 3 m  $r = 1\frac{1}{2} \text{ m}$

6. Calculate the diameter (D) of a circle if the radius is:  
   a) 5 cm  $D = 10\text{ cm}$  
   b) 8 mm  $D = 16\text{ mm}$  
   c) 13 cm  $D = 26\text{ cm}$  
   d) 26 mm  $D = 52\text{ mm}$  
   e) 1$\frac{1}{2}$ m  $D = 3\text{ m}$  
   f) 2$\frac{1}{2}$ m  $D = 5\text{ m}$

7. Complete:  
   a) Draw a diameter for the smaller circle starting from the dot on its boundary.
   b) Draw a radius for the bigger circle, starting from the dot on its boundary.  
   c) The two lines which you have drawn are **perpendicular** to one another.
1. Study: The instrument used for drawing circles is called a pair of compasses.
   a) Examine the pair of compasses in your geometry set and check to see that the point of the pencil is sharp and level with the metal point and that the screw at the top is tight.
   b) The distance from the pencil point to the metal point of the pair of compasses is the radius of the circle.

2. Push the metal point of the pair of compasses into a separate sheet of paper. Practice drawing circles, with any radii, by rotating the arm holding the pencil.

3. Draw circles with radii of:
   a) 1 cm  b) 25 mm  c) 33 mm  d) 5 cm  e)* 4.5 cm = 45 mm

*4. Draw circles with diameters of: NB: First calculate the radius of each.
   a) 4 cm Hint: radius = 2 cm  
   b) 68 mm radius = 34 mm  
   c) 5 cm radius = 25 mm

5. Use a compass to replicate the following circle patterns on a separate sheet of paper.
   a) 
   b) 
   c)
Section 6: Transformations

Question 1 | Translations

1. Study: To “translate” a shape means to you **slide** or **move** the shape. This can be done in three different ways:

1. **Side-ways**
   - “Horizontally” 5 units right

2. **Upwards or Downwards**
   - “Vertically” 3 units down

3. In a **slanted** direction
   - “Diagonally” 2 units right and 2 units up (vice versa).

When a figure is translated, its position is changed but not its shape. The new position of the figure is called the image of the original figure.

For example, Triangle “B” is called the image of triangle “A” after a translation 5 units right.

2. Complete each sentence.
   a) To translate a shape means that you **slide/move** the shape.
   b) Shapes can be translated in **three** different ways:
      1. **side-ways** (horizontally)
      2. **upwards or downwards** (vertically)
      3. In a **slanted** direction (diagonally)
   c) When a figure is translated, its **position** is changed but not its **shape**.
   d) The new position of the figure is called the **image** of the original figure.

3. Translate each shape 2 units right.
   a) ![Shape A](image1)
   b) ![Shape B](image2)

4. Translate each shape 3 units left.
   a) ![Shape A](image3)
   b) ![Shape B](image4)

5. Translate each shape 2 units down.
   a) ![Shape A](image5)
   b) ![Shape B](image6)

6. Translate each shape 3 units up.
   a) ![Shape A](image7)
   b) ![Shape B](image8)

7. Translate each shape 2 units left and 3 units down.
   a) ![Shape A](image9)
   b) ![Shape B](image10)
   c) ![Shape C](image11)
   d) ![Shape D](image12)
1. Study: To draw the reflection of a shape or figure, means to draw its mirror image.
   a) Reflection to the left or to the right.
   b) Reflection upwards or downwards.

   When a figure is reflected, its position is changed but not its shape. The new position of the figure is called the image of the original figure.

2. Complete each sentence.
   a) To draw the reflection of a shape means to draw its mirror image.
   b) A figure reflected to the left or to the right is reflected across the vertical line of symmetry.
   c) When a figure is reflected, its position is changed but not its shape.

3. Draw the reflection of each shape across the vertical line of symmetry.

4. Draw the reflection of each shape across the horizontal line of symmetry.

5. Reflect the letters across the given lines.

6. Reflect the word across the given line.
Question 3 | Translations and Reflections

1. State whether each transformation is a translation or a reflection.

a)  translation

b)  reflection

c)  reflection

d)  translation

*e)  translation

*f)  reflection

Question 4 | Rotations: Part 1

1. Study:

<table>
<thead>
<tr>
<th>Revolution</th>
<th>Straight angle</th>
<th>Right angle</th>
</tr>
</thead>
</table>
| A full turn.  
It is equal to 4 right angles.  
Revolution = 360° | Half of a revolution  
It is equal to 2 right angles.  
Straight angle = 180° | Quarter of a revolution  
Right angle = 90° |

2. Complete:
   a) A revolution is equal to \(4\) right angles.
   b) A straight angle is equal to \(2\) right angles and can also be called \text{half}\ of a revolution.
   c) A right angle can also be called a \text{quarter}\ of a revolution.

3. Study: To \text{rotate} an object or figure means to \text{turn} it around about a fixed point. Rotation can occur in two possible \text{directions}.

A \text{clockwise} motion is one that proceeds in the \text{same direction} as a clock’s hands.

An \text{anti-clockwise} motion is one that proceeds in the \text{opposite direction} as a clock’s hands.

4. State whether each rotation is clockwise or anti-clockwise.

a)  clockwise

b)  \text{anti-clockwise}

c)  clockwise

d)  \text{anti-clockwise}

e)  \text{anti-clockwise}

f)  clockwise

g)  \text{anti-clockwise}

h)  clockwise
Question 5 Rotations: Part 2

1. Draw the new position of each object below after rotating it through:

1.1 a quarter of a revolution ($90^\circ$) in a clockwise direction.

1.2 a quarter of a revolution ($90^\circ$) in an anti-clockwise direction.

1.3 a half of a revolution ($180^\circ$).

1.4* a quarter of a revolution ($90^\circ$) in a clockwise direction.

The direction of rotation does not affect the outcome when rotating through half of a revolution.
Question 6 | Mixed Questions

1. State whether each transformation is a translation, a reflection or a rotation.
   a) Rotation
   b) Reflection
   c) Translation
   d) Reflection
   e) Translation

2. Name the type of transformation for each pair of leaves.
   a) Leaf A to B. Translation
   b) Leaf G to H Reflection
   c) Leaf C to D Rotation
   d) Leaf E to F Reflection

3. Draw the new positions of parallelogram (A) as described in the transformations below.
   a) Translate parallelogram A three units left and one unit up. Name the image A'.
   b)* Reflect parallelogram A to the right and then translate the reflection 1 unit down. Name the image A''.

   c) What do you notice about the shape and size of parallelograms A, A' and A''?
      All three parallelograms are identical in shape and in size.

4. Draw the new positions of triangle B and C as described in the transformations below.
   a) Reflect triangle B upwards and then translate the reflection 3 units right. Name the new triangle B'.
   b) Rotate triangle C 90° around the point, in a clockwise direction. Name the new triangle C'.
Section 7: Temperature

Question 1 | Temperature on a Thermometer: Part 1

1. Study:

On a hot day we say that the temperature is high.
On a cold day the temperature is low.

The unit which is used to measure temperature is called degrees Celsius. The symbol for a degree is “ °C ”.

The instrument used for measuring temperature is called a thermometer.

You bake biscuits in the oven at about 180 °C.
The temperature inside your fridge should be 3,5 °C so that your food stays cold but does not freeze.

2. Fill in the missing word(s) in each sentence.

a) The unit which is used to measure temperature is called degrees Celsius.
b) Normal body temperature is 37 °C, water boils at 100 °C and water freezes at 0 °C.

3. Which temperature is nearest to correct?

a) Oven for baking 80 °C 280 °C 180 °C
b) Boiling water 10 °C 50 °C 100 °C
c) Inside a fridge 1,5 °C 3,5 °C 6,5 °C
d) A hot day 16 °C 36 °C 86 °C

4. Write down the temperature shown on each thermometer and then answer the questions.

A     B       C        D         E          F

a) What is the difference in the temperatures indicated on thermometers B and D? 12,5 °C (60 °C – 47,5 °C)
b) By how many degrees must the temperature on C rise to reach 100 °C? 65 °C (100 °C – 35 °C)
c) By how many degrees must the temperature on A fall to reach normal body temperature? 50 °C – 37 °C = 13 °C
Question 2 | Temperature on a Thermometer: Part 2

1. Study: If the temperature is 36°C, it means that it is a very hot day. If the temperature is –3°C, it means that the temperature is 3 degrees below zero. It is a very cold day.

2. Which is warmer, a) 25°C or 20°C? 25°C b) 5°C or 0°C? 5°C c) –10°C or 0°C? 0°C d)* –8°C or –12°C? –8°C

3. Which is colder, a) 27°C or 17°C? 17°C b) 0°C or 2°C? 0°C c) –5°C or 0°C? –5°C d)* –3°C or –9°C? –9°C

4. Write down the temperature shown on each thermometer and then answer the questions.

![Thermometer Images]

a) By how many degrees must the temperature on A fall to reach 0°C? 25°C
b) By how many degrees must the temperature on D rise to reach 0°C? 20°C
c) What is the difference in the temperatures indicated on thermometers A and E? 10°C
d) What is the difference in the temperatures indicated on thermometers B and C? 5°C
e)* What is the difference in the temperatures indicated on thermometers C and D? 15°C

5. Consider Thermometer A above. [25°C]
a) If the temperature rises by 15°C, it will be 40°C. [25°C + 15°C]
b) If the temperature drops by 25°C, it will be 0°C. [25°C – 25°C]
c)* If the temperature drops by 30°C, it will be -5°C. [25°C – 30°C]

*6. Consider Thermometer F above. [-15°C]
a) If the temperature rises by 15°C, it will be 0°C. [-15°C + 15°C]
b) If the temperature rises by 5°C, it will be -10°C. [-15°C + 5°C]
c) If the temperature rises by 20°C, it will be 5°C. [-15°C + 20°C]
d) If the temperature drops by 10°C, it will be -25°C. [-15°C – 10°C]
**Question 3 | “Rising” or “Falling” Temperatures**

1. Complete:

<table>
<thead>
<tr>
<th>Original Temperature</th>
<th>Change in °C</th>
<th>New Temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>15°C</td>
<td>rises 10</td>
<td>25°C</td>
</tr>
<tr>
<td>40°C</td>
<td>falls 7</td>
<td>33°C</td>
</tr>
<tr>
<td>8°C</td>
<td>falls 8</td>
<td>0°C</td>
</tr>
<tr>
<td>32°C</td>
<td>falls 25</td>
<td>7°C</td>
</tr>
<tr>
<td>5°C</td>
<td>rises 18</td>
<td>23°C</td>
</tr>
<tr>
<td>14°C</td>
<td>falls 14</td>
<td>0°C</td>
</tr>
<tr>
<td>15°C</td>
<td>rises 16</td>
<td>31°C</td>
</tr>
</tbody>
</table>

2. Complete:

<table>
<thead>
<tr>
<th>Original Temperature</th>
<th>Change in °C</th>
<th>New Temperature</th>
</tr>
</thead>
<tbody>
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<td>falls 9</td>
<td>-1°C</td>
</tr>
<tr>
<td>10°C</td>
<td>falls 15</td>
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</tr>
<tr>
<td>7°C</td>
<td>falls 8</td>
<td>-1°C</td>
</tr>
<tr>
<td>12°C</td>
<td>falls 14</td>
<td>-2°C</td>
</tr>
<tr>
<td>3°C</td>
<td>falls 8</td>
<td>-5°C</td>
</tr>
<tr>
<td>8°C</td>
<td>falls 12</td>
<td>-4°C</td>
</tr>
<tr>
<td>17°C</td>
<td>falls 20</td>
<td>-3°C</td>
</tr>
</tbody>
</table>

---

**Question 4 | Temperature (Decimal Fractions)**

1. Consider each thermometer below and then answer the questions that follow.

   ![Thermometers A, B, C, D]

   **1.1** What is the difference in the temperatures indicated on
   a) thermometers A and C? \(37.5°C - 2.5°C = 35°C\)
   b) thermometers B and C? \(85.2°C - 2.5°C = 82.7°C\)
   c) thermometers A and B? \(85.2°C - 37.5°C = 47.7°C\)

   **1.2** By how many degrees must the temperature on
   a) D rise to reach 0°C? \(5.5°C\)
   b) C fall to reach 0°C? \(2.5°C\)
   c) A fall to reach 35°C? \(2.5°C\)
   d) B rise to reach the boiling point of water? \(100°C - 85.2°C = 14.8°C\)

---

**Question 5 | Problem Solving**

1. The following temperatures were recorded in Upington, Kimberley and Bloemfontein respectively at 10:00 on a certain day in January: 21°C, 19°C, 12°C.

   a) Which town was the coldest at 10:00? **Bloemfontein**
   b) How much warmer was it in Upington than in Kimberley at 10am? \(21°C - 19°C = 2°C\)
   c) The temperature in Bloemfontein increased by 1°C every 2 hours. What was the temperature at 14:00? \(10:00 to 14:00 = 4 hours\) \(12°C + 4°C(2°C) = 14°C\)

2. When James was ill his temperature rose from 37.5°C at 08:00 to 39.9°C at 10:00 and then decreased to 38°C at 12:00.

   a) By how much did his temperature rise between 08:00 and 10:00? \(39.9°C - 37.5°C = 2.4°C\)
   b) By how much did his temperature decrease between 10:00 and 12:00? \(39.9°C - 38°C = 1.9°C\)
Assessment 2

1. Circle the correct answer in each.

1.1. Which of the following is not a quadrilateral?
   a) kite  b) rhombus  c) square  d) prism  e) trapezium

1.2. At 3:30pm the temperature in Pretoria is 27°C. If the temperature decreases by 3°C every 2 hours, what is the temperature in Pretoria at 21:30? (15:30 to 21:30 is 6 hours)
   a) 18°C  b) 20°C  c) 9°C  d) None of the above

1.3. A circle with a radius of 36mm has a diameter of
   a) 360mm  b) 18cm  c) 7.2cm  d) 720mm

1.4. In the figure, WX and ZY are...
   a) perpendicular line segments.  b) intersecting line segments.
   c) parallel line segments.  d) vertical line segments.

2. Complete:

<table>
<thead>
<tr>
<th>Name</th>
<th>Number of</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>right angles</td>
</tr>
<tr>
<td>Rectangle</td>
<td>4</td>
</tr>
</tbody>
</table>

3. Label the views of the object below.

4. Draw the new positions of parallelogram A and triangle B as described below.
   a) Reflect parallelogram A upwards and then translate the reflection 3 units to the left.
   b) Rotate triangle B \( \frac{3}{4} \) of a revolution around the point in a clockwise direction.
Question 1  | The Basics

1. Study: Percent means “per hundred” or “something out of 100”. A percentage is therefore a fraction in which the denominator is 100.

The symbol for percent is %. Let’s look at some examples.

a) \(\frac{7}{100}\) means seven out of a hundred. It is equal to 7 percent and is written 7%.

b) \(\frac{65}{100}\) means sixty-five out of a hundred. It is equal to 65 percent and is written 65%.

2. True or False?  
   a) Percent means “per hundred”.  \[\text{True}\] 
   b) A percentage is a fraction out of 100.  \[\text{True}\]

3. Write each fraction as a percentage:
   a) \(\frac{3}{100}\) = 3%  
   b) \(\frac{15}{100}\) = 15%  
   c) \(\frac{7}{100}\) = 7%  
   d) \(\frac{20}{100}\) = 20%  
   e) \(\frac{99}{100}\) = 99%  
   f) \(\frac{8}{100}\) = 8%  
   g) \(\frac{39}{100}\) = 39%  
   h) \(\frac{77}{100}\) = 77%  
   i) \(\frac{80}{100}\) = 80%  
   j) \(\frac{100}{100}\) = 100%

4. Write each percentage in fraction form.
   a) 37% = \(\frac{37}{100}\)  
   b) 11% = \(\frac{11}{100}\)  
   c) 97% = \(\frac{97}{100}\)  
   d) 3% = \(\frac{3}{100}\)  
   e) 49% = \(\frac{49}{100}\)

5. Write each percentage in the simplest fraction form. \[\text{Hint: } \frac{100}{20} = 5\]
   a) 10% = \(\frac{10}{100}\) = \(\frac{1}{10}\)  
   b) 20% = \(\frac{20}{100}\) = \(\frac{1}{5}\)
   c) 30% = \(\frac{30}{100}\) = \(\frac{3}{10}\)  
   d) 70% = \(\frac{70}{100}\) = \(\frac{7}{10}\)  
   e) 90% = \(\frac{90}{100}\) = \(\frac{9}{10}\)
   f) 40% = \(\frac{40}{100}\) = \(\frac{2}{5}\)  
   g) 60% = \(\frac{60}{100}\) = \(\frac{3}{5}\)  
   h) 80% = \(\frac{80}{100}\) = \(\frac{4}{5}\)

   *or we can simplify in two steps: 20% = \(\frac{20}{100}\) = \(\frac{2}{10}\) = \(\frac{1}{5}\)

6. Study: \(\frac{100}{4} = 25\) and \(\frac{100}{5} = 20\). 
   a) 12% = \(\frac{12}{100}\) = \(\frac{3}{25}\)  
   b) 25% = \(\frac{25}{100}\) = \(\frac{1}{4}\)  
   c) 55% = \(\frac{55}{100}\) = \(\frac{11}{20}\)

7. Write each percentage in the simplest fraction form.
   a) 25% = \(\frac{1}{4}\)  
   b) 5% = \(\frac{5}{100}\) = \(\frac{1}{20}\)  
   c) 8% = \(\frac{8}{100}\) = \(\frac{2}{25}\)  
   d) 2% = \(\frac{2}{100}\) = \(\frac{1}{50}\) 
   e) 15% = \(\frac{15}{100}\) = \(\frac{3}{20}\)  
   f) 16% = \(\frac{16}{100}\) = \(\frac{4}{25}\)  
   g) 45% = \(\frac{45}{100}\) = \(\frac{9}{20}\)  
   h) 32% = \(\frac{32}{100}\) = \(\frac{8}{25}\)  
   i) 55% = \(\frac{55}{100}\) = \(\frac{11}{20}\)

*75% = \(\frac{3}{4}\)

These answers must be memorised.
Question 2  Writing Percentages

1. Study: To write a common fraction as a percentage you must first write it as a fraction with a denominator of 100.

Examples:

a) \( \frac{3}{10} = \frac{30}{100} \) therefore \( \frac{3}{10} = 30\% \)

b) \( \frac{2}{5} = \frac{40}{100} \) therefore \( \frac{2}{5} = 40\% \)

We can do b) in two steps:

\( \frac{2}{5} = \frac{4}{10} = \frac{40}{100} \)

2. Write each fraction as a percentage.

a) \( \frac{1}{10} = \frac{10}{100} = 10\% \)

\( \frac{3}{10} = \frac{30}{100} = 30\% \)

\( \frac{7}{10} = \frac{70}{100} = 70\% \)

\( \frac{9}{10} = \frac{90}{100} = 90\% \)

b) \( \frac{1}{5} = \frac{20}{100} = 20\% \)

\( \frac{2}{5} = \frac{40}{100} = 40\% \)

\( \frac{3}{5} = \frac{60}{100} = 60\% \)

\( \frac{4}{5} = \frac{80}{100} = 80\% \)

3. Study the following examples. It is useful to memorise these answers.

a) \( \frac{1}{2} = \frac{50}{100} \)

Thus \( \frac{1}{2} = 50\% \)

b) \( \frac{1}{4} = \frac{25}{100} \)

Thus \( \frac{1}{4} = 25\% \)

c) \( \frac{3}{4} = \frac{75}{100} \)

Thus \( \frac{3}{4} = 75\% \)

4. Write each fraction as a percentage.

a) \( \frac{1}{4} = 25\% \)

b) \( \frac{1}{2} = 50\% \)

c) \( \frac{3}{4} = 75\% \)

5. Study the following examples.

a) \( \frac{7}{50} = \frac{14}{100} \)

Thus \( \frac{7}{50} = 14\% \)

b) \( \frac{3}{25} = \frac{12}{100} \)

Thus \( \frac{3}{25} = 12\% \)

c) \( \frac{11}{20} = \frac{55}{100} \)

Thus \( \frac{11}{20} = 55\% \)

6. Write each fraction as a percentage.

a) \( \frac{1}{50} = \frac{2}{100} = 2\% \)

b) \( \frac{1}{25} = \frac{4}{100} = 4\% \)

c) \( \frac{1}{20} = \frac{5}{100} = 5\% \)

d) \( \frac{1}{2} = 50\% \)

3 \( \frac{3}{50} = \frac{6}{100} = 6\% \)

7 \( \frac{7}{25} = \frac{28}{100} = 28\% \)

9 \( \frac{9}{20} = \frac{45}{100} = 45\% \)

11 \( \frac{11}{50} = \frac{22}{100} = 22\% \)

17 \( \frac{17}{25} = \frac{68}{100} = 68\% \)

3 \( \frac{3}{4} = 75\% \)

37 \( \frac{37}{50} = \frac{74}{100} = 74\% \)

24 \( \frac{24}{25} = \frac{96}{100} = 96\% \)

17 \( \frac{17}{20} = \frac{85}{100} = 85\% \)

7 \( \frac{7}{10} = 70\% \)

\[ \frac{1}{4} = 25\% \text{ therefore } \frac{1}{8} = 12\frac{1}{2}\% \text{ [25\% ÷ 2]} \]

1 \( \frac{1}{8} \) written as a percentage is: a) 8\% b) 18\% c) 25\% d) 12\frac{1}{2}\%
**Question 3 | Problem Solving: Part 1**

1. Consider Junior’s test results below. Write each result as a percentage.
   
   a) **Maths** 9 out of 10 \[ \frac{9}{10} = 90\% \]
   
   b) **English** 15 out of 20 \[ \frac{15}{20} = 75\% \]
   
   c) **Afrikaans** 63 out of 100 \[ \frac{63}{100} = 63\% \]
   
   d) **Science** 17 out of 25 \[ \frac{17}{25} = 68\% \]

2. 60 boys and 40 girls go on a school trip. Hint: There are 100 learners in total.
   
   What percentage of the learners are a) boys? \[ \frac{60}{100} = 60\% \]
   
   b) girls? \[ \frac{40}{100} = 40\% \]

3. In Grade 6, 28 boys and 22 girls received an academic achievement award.
   
   a) How many learners received an award? \[ 28 + 22 = 50 \]
   
   b) What percentage of the learners that received awards are girls? \[ \frac{22}{50} = 44\% \]

4. For my birthday party, mom orders 6 chicken pizzas and 4 ham pizzas. = 10 pizzas in total
   
   What percentage of the pizzas are chicken pizzas? \[ \frac{6}{10} = 60\% \]

5. 35 of the 50 learners in the school choir are girls.
   
   a) How many learners in the choir are boys? \[ 50 - 35 = 15 \]
   
   b) What percentage of the choir members are boys? \[ \frac{15}{50} = 30\% \]

6. Alex has 25 marbles in total. 18 marbles are red and the rest are blue. \[ 25 - 18 = 7 \text{ blue} \]
   
   What percentage of the marbles are blue? \[ \frac{7}{25} = 28\% \]

**Question 4 | Problem Solving: Part 2**

1. Study: Remember, percent (%) means “per hundred”.
   
   a) If 40% of a pizza is eaten it means 60% of the pizza is not eaten (left over).
      This is because the \% eaten and the \% not eaten must add up to 100%.
   
   b) One class represents 100% of the learners.
      In a class, each learner is either a boy or a girl.
      If 45% of the learners are girls we know that 55% of the learners are boys.
      This is because the \% of girls and the \% of boys must add up to 100%.

2. Complete.
   
   a) Paul spends 80% of his money. What % of his money does he have left? \[ 20\% \]
   
   b) 55% of the learners in Grade 6 are boys. What % the learners are girls? \[ 45\% \]
   
   c) 25% of a pizza is left over. \[ \frac{75}{100} = 75\% \] of the pizza was eaten.
   
   d) 96% of learners are at school on Monday. What % of the learners are absent? \[ 4\% \]

3. Complete.
   
   a) 25% of the balls in a bag are blue, 30% are red and the rest are green.
      What percentage of the balls are green? \[ 100\% - (25\% + 30\%) = 100\% - 55\% = 45\% \]
   
   b) In a Grade 6 class, 20% of the learners support Manchester United, 45% support Liverpool and the rest support Arsenal. \[ 35\% \] of the learners support Arsenal.
**Question 5 | Percentage Calculations: Part 1**

1. Study: We know that 10% is equal to \( \frac{1}{10} \) in its simplest fraction form.

   Therefore  
   a) 10% of 40 = \( \frac{1}{10} \) of 40 = 4  
   b) 10% of 120 = \( \frac{1}{10} \) of 120 = 12

   *Working out 10% of a number is the same as dividing the number by 10.*

2. Complete by doing mental calculations.
   a) 10% of 50 = 5  
   b) 10% of 20 = 2  
   c) 10% of 150 = 15  
   d) 10% of 230 = 23

3. Study the examples below.
   Notice that once 10% of a number is calculated, it is easy to calculate 20%, 30%, 40% etc. of the number.

   Examples:  
   a) 10% of 30 = \( \frac{1}{10} \) of 30 = 3  
   20% of 30 = \( 2 \times \frac{1}{10} \) of 30 = 6
   80% of 30 = \( 8 \times \frac{1}{10} \) of 30 = 24
   
   b) 10% of 90 = \( \frac{1}{10} \) of 90 = 9  
   40% of 90 = \( 4 \times \frac{1}{10} \) of 90 = 36  
   90% of 90 = \( 9 \times \frac{1}{10} \) of 90 = 81

   *Note:* 50% is equal to \( \frac{1}{2} \) in its simplest fraction form therefore 50% of 80 = 40

4. Complete by doing mental calculations.
   a) 10% of 40 = 4  
   b) 10% of 70 = 7  
   c) 10% of 120 = 12  
   d) 20% of 60 = 12  
   20% of 40 = 8  
   30% of 70 = 21  
   20% of 120 = 24  
   80% of 90 = 72

5. Study:  
   a) 25% is equal to \( \frac{1}{4} \) in its simplest fraction form. 25% of 40 = \( \frac{1}{4} \) of 40 = 10
   b) 75% is equal to \( \frac{3}{4} \) in its simplest fraction form. 75% of 40 = \( \frac{3}{4} \) of 40 = 30

6. Write each percentage in the simplest fraction form.
   a) 50% = \( \frac{1}{2} \)  
   b) 25% = \( \frac{1}{4} \)  
   c) 75% = \( \frac{3}{4} \)  
   d) 20% = \( \frac{1}{5} \)  
   e) 60% = \( \frac{3}{5} \)

7. Complete.  
   Change each percentage into its simplest fraction form before calculating.
   a) 25% of 24 = \( \frac{1}{4} \) of 24 = 6  
   b) 25% of 16 = \( \frac{1}{4} \) of 16 = 4  
   c) 25% of 80 = \( \frac{1}{4} \) of 80 = 20
   75% of 24 = \( \frac{3}{4} \) of 24 = 18  
   50% of 16 = \( \frac{1}{2} \) of 16 = 8  
   75% of 80 = \( \frac{3}{4} \) of 80 = 60
   d) 20% of 15 = \( \frac{1}{5} \) of 15 = 3  
   e) 20% of 35 = \( \frac{1}{5} \) of 35 = 7  
   f) 10% of 95 = \( \frac{1}{10} \) of 95 = 9.5
   60% of 15 = \( \frac{3}{5} \) of 15 = 9  
   80% of 35 = \( \frac{4}{5} \) of 35 = 28  
   40% of 95 = \( \frac{2}{5} \) of 95 = 38

8. John lost 25% of his 60 marbles in a game. How many marbles did John lose?
   1/4 of 60 = 15

9. 60% of the 125 learners in Grade 6 are boys.
   a) What % of the Grade 6 learners are girls? 40%  
   b) How many learners are boys? \( \frac{3}{5} \) of 125 = 75
1. Can you think of an easy way to calculate 5% of a number? Yes, it is half of what 10% is.

2. Study the following examples below.

   a) 10% of 80 = \( \frac{10}{100} \) of 80 = 8       b) 30% of 120 = \( \frac{30}{100} \) of 120 = 36
   5% of 80 = \( \frac{5}{100} \) of 80 = 4            5% of 120 = \( \frac{5}{100} \) of 120 = 6
   15% of 80 = \( \frac{15}{100} \) of 80 = 12        35% of 120 = \( \frac{35}{100} \) of 120 = 42
   \[ \text{[half of 10%]} \] \[ \text{[half of 10%]} \] \[ \text{[10% + 5%]} \] \[ \text{[30% + 5%]} \]

   Do you notice that once 5% of a number is calculated, it is easy to calculate 15%, 35%, 45% etc of the number?

3. Calculate 5% of each number.

   a) 5% of 40 = \( \frac{2}{20} \)       b) 5% of 60 = \( \frac{3}{20} \)       c) 5% of 240 = \( \frac{12}{20} \)
   5% of 600 = \( \frac{30}{20} \)       5% of 120 = \( \frac{6}{20} \)       5% of 4800 = \( \frac{240}{20} \)

4. Write each percentage in the simplest fraction form.

   a) 15% = \( \frac{3}{20} \)       b) 35% = \( \frac{7}{20} \)       c) 45% = \( \frac{9}{20} \)       d) 65% = \( \frac{13}{20} \)       e) 95% = \( \frac{19}{20} \)

   *5. Can you think of an easy way to calculate 95% of 40? Yes, 95% of 40 = 40 - 2 = 38
   It is 5% less than 40.

6. Complete:

   a) 15% of 60 = \( \frac{3}{20} \) of 60 = 9       b) 35% of 120 = \( \frac{7}{20} \) of 120 = 42       c) 15% of 400 = \( \frac{3}{20} \) of 400 = 60
   45% of 60 = \( \frac{9}{20} \) of 60 = 27       95% of 120 = \( \frac{19}{20} \) of 120 = 114       65% of 400 = \( \frac{13}{20} \) of 400 = 260

7. Write each percentage in the simplest fraction form.

   a) 8% = \( \frac{2}{25} \)       b) 12% = \( \frac{3}{25} \)       c) 18% = \( \frac{9}{50} \)       d) 24% = \( \frac{6}{25} \)       e) 98% = \( \frac{49}{50} \)

   *8. Complete:

   a) 8% of 50 = \( \frac{2}{25} \) of 50 = 4       b) 12% of 50 = \( \frac{3}{25} \) of 50 = 6       c) 18% of 150 = \( \frac{9}{50} \) of 150 = 27
   8% of 250 = \( \frac{2}{25} \) of 250 = 20       24% of 75 = \( \frac{6}{25} \) of 75 = 18       98% of 5000 = \( \frac{49}{50} \) of 5000 = 4900

9. Complete: [Mixed Questions]

   a) 25% of 24 = \( \frac{6}{25} \) of 24 = 6       b) 1% of 400 = \( \frac{1}{100} \) of 400 = 4       c) 20% of 15 = \( \frac{3}{10} \) of 15 = 3
   d) 90% of 60 = \( \frac{9}{10} \) of 60 = 54       e) 35% of 180 = \( \frac{3}{20} \) of 180 = 63       f) 50% of 90 = \( \frac{1}{2} \) of 90 = 45
   *g) 5% of 70 = \( \frac{35}{7} \) \( \frac{1}{2} \) of 10% \( \frac{7}{7} \)       *h) 10% of 85 = \( \frac{1}{10} \) of 85 = 8,5       i) 75% of 128 = \( \frac{3}{4} \) of 128 = 96
   *g) 95% of 60 = \( \frac{57}{50} \) \( \frac{3}{5} \) of \( \frac{3}{2} \)       *k) 2% of 3200 = \( \frac{1}{50} \) of 3200 = 64       l) 12% of 75 = \( \frac{3}{25} \) of 75 = 9
Question 7 | Percentage Calculations: Problem Solving

1. Gabi has R200. She spends 60% of her money. How much does she spend? \[ \frac{6}{10} \text{ of } R200 = R120 \]

2. Theo has completed 25% of an 8-hour trip to the coast.
   a) What % of the trip is left? \[ 100\% - 25\% = 75\% \text{ of the trip is left} \]
   b) How long does he still have to travel? \[ \frac{3}{4} \text{ of } 8h = 6h \]

3. There are 125 learners in Grade 6 of which 52% are girls. How many learners are boys? \[ 48\% \text{ are boys} \]
   \[ \frac{48\%}{125} = \frac{12}{25} \text{ of } 125 = 60 \text{ boys} \]

4. There are 120 learners Grade 6. How many learners liked each of the following if:
   a) 20% liked Grey's Anatomy? \[ \frac{2}{10} \text{ of } 120 = 24 \text{ learners} \]
   b) 50% liked Vampire diaries? \[ \frac{1}{2} \text{ of } 120 = 60 \text{ learners} \]
   c) The rest liked Modern Family? \[ 36 \text{ learners} \] \[
\begin{align*}
120 &- 84 = 36 \\
\frac{3}{10} \text{ of } 120 & = 36 \text{ learners}
\end{align*}
\]

*5. Sia spends 60% of R180 on movie tickets and 25% of the remaining money on popcorn.
   How much money does she have left?

   1. Cost of tickets = \( \frac{6}{10} \text{ of } 180 = R108 \)
   2. Money left = R180 - R108 = R72
   3. Cost of popcorn = \( \frac{1}{4} \text{ of } 72 = R18 \)
   4. Money left = R72 - R18 = R54

Question 8 | Problem Solving [Mixed]

1. 25 of the 50 people at a school play are children, 15 are men and the rest are women.
   a) What percentage of the people are children? \[ \frac{25}{50} = \frac{50}{100} = 50\% \]
   b) What percentage of the people are women? \[ \frac{10}{50} = \frac{20}{100} = 20\% \]

2. Janie receives 15% discount on a t-shirt marked R160.
   How much discount does she receive? \[ \frac{3}{20} \text{ of } R160 = R24 \]

3. Junior spends 65% of his money. What % of his money is left? \[ 100\% - 65\% = 35\% \]

4. Mr Jones rents an apartment for R3200 per month. The deposit is 25% of the monthly rent.
   How much is the deposit? \[ \frac{1}{4} \text{ of } R3200 = R800 \]

5. 85% of the 60 athletes on a team are male. How many female athletes are there on the team?
   \[ 100\% - 85\% = 15\% \text{ are female} \]
   \[ \frac{3}{20} \text{ of } 60 = 9 \text{ females} \]

*6. John spent 30% of his R200 on takeaways and 95% of the remaining money on shoes.
   How much money does he have left?

   1. Cost of takeaways = \[ \frac{3}{10} \text{ of } 200 = R60 \]
   2. Money left = R200 - R60 = R140
   3. Cost of shoes = \[ \frac{19}{20} \text{ of } 140 = R133 \]
   4. Money left = R140 - R133 = R7

7. 18% of the 124 Grade 6 learners are absent on Monday after a long weekend.
   What percentage of the learners are at school? \[ 100\% - 18\% = 82\% \text{ are at school} \]
Section 9: Data Handling

Question 1 | Terminology: Revision

1. Complete:   
   a) What is data?  **Data is any information that is collected.**
   b) How is data collected?  **Counting things, asking questions or doing surveys.**
   c) The list of questions used in a survey is called a **questionnaire.**
   d) How is data organised?  **Tallies, tables, graphs or charts** e.g. bar graphs, pictographs, tally charts, pie charts.
   e) Why is data organised?  **It makes the data easier to read and to interpret.**
   Trends, frequencies, averages and misleading data can easily be identified if data is in an organised format.
   f) An important survey which a government conducts to gather information about the people in a country is called a **census.**

Question 2 | Pictographs and Tally Charts

1. The pictograph shows the favourite pizza of learners in Grade 6.

<table>
<thead>
<tr>
<th>Pizza</th>
<th>Number of learners</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plain</td>
<td></td>
<td>24</td>
</tr>
<tr>
<td>Ham</td>
<td></td>
<td>18</td>
</tr>
<tr>
<td>Chicken</td>
<td></td>
<td>30</td>
</tr>
<tr>
<td>Vegetarian</td>
<td></td>
<td>3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Pizza</th>
<th>Number of learners</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plain</td>
<td></td>
<td>24</td>
</tr>
<tr>
<td>Ham</td>
<td></td>
<td>18</td>
</tr>
<tr>
<td>Chicken</td>
<td></td>
<td>30</td>
</tr>
<tr>
<td>Vegetarian</td>
<td></td>
<td>3</td>
</tr>
</tbody>
</table>

a) Draw picture(s) on the pictograph to represent that 18 children chose Ham.

b) How many learners took part in this survey?  **24 + 18 + 30 + 3 = 75**

c)* What fraction of the learners like ham pizza the most?  **Leave your answer in the simplest form.**

\[
\frac{\text{No. of learners that chose Ham}}{\text{Total no. of learners}} = \frac{18}{75} = \frac{6}{25} = \frac{24}{100} = 24\%
\]

d)* Write your answer for c) as a percentage.

Question 3 | Average

1. Study: To work out an average, add the numbers together and divide the sum by the total number of numbers. For example:

- The average of 8 and 6 is 7 because \[\frac{8+6}{2} = \frac{14}{2} = 7\]
  We divide by 2 because there are 2 numbers.
- The average of 8, 12 and 7 is 9 because \[\frac{8+12+7}{3} = \frac{27}{3} = 9\]
  We divide by 3 because there are 3 numbers.
- The average of 4, 5, 7, 9 and 10 is 7 because \[\frac{4+5+7+9+10}{5} = \frac{35}{5} = 7\]
  We divide by 5 because there are 5 numbers.

2. Calculate the average for each of the following sets of numbers.

   a) 7 and 4
   \[\frac{7+4}{2} = \frac{11}{2} = \frac{5}{2}\]

   b) 10, 4 and 7
   \[\frac{10+4+7}{3} = \frac{21}{3} = 7\]

   c) 12, 8, 11 and 9
   \[\frac{12+8+11+9}{4} = \frac{40}{4} = 10\]

   d) 12 and 19
   \[\frac{12+19}{2} = \frac{31}{2} = \frac{15}{2}\]

   *d) 12 and 19
1. Study:
   a) The number or item that occurs the most in a data set is called the mode.
   Example: 0 3 4 4 6 7 9 10 11 Mode = 4
   To help you remember, the mode occurs the most.
   b) The middlemost number in an ordered data set is called the median
   “Ordered” means that the numbers must be written from the lowest to the highest.
   Example: 1 2 3 3 5 7 8 10 11 Median = 5
   To help you remember, the median is in the middle.

2. Determine the mode and the median for each of the following data sets.
   Remember, first order the numbers from the lowest to the highest.
   a) 7 5 10 15 4 12 5 9 6 Mode = 5 Median = 7
      4 12 5 9 10 12 15
   b) 13 6 10 13 9 15 11 7 13 3 6 Mode = 13 Median = 10
      3 6 6 7 9 10 11 13 13 13 15
   c)* 8 12 7 4 6 1 13 6 4 3 7 10 5 2 6 Mode = 6 Median = 5
      1 2 3 4 4 5 6 6 6 7 7 8 10 12 13
   d)* 118 113 120 113 110 96 115 87 105 Mode = 113 Median = 113
      87 96 105 110 113 113 115 118 120

3. Study: In the data set below the mode is 4.
   The median however lies exactly in between 5 and 9.
   1 4 4 5 9 10 11 13
   By calculation we get the following answer: The median = (5 + 9) ÷ 2
   = 14 ÷ 2
   = 7
   We work out the average of 5 and 9.

4. Determine the mode and the median for each of the following data sets.
   a) 13 5 11 13 9 15 7 13 4 5 Mode = 13 Median = 10
      4 5 5 7 9 13 13 13 15
   b)* 54 53 42 65 45 40 56 60 42 48 Mode = 42 Median = 50 ½
      40 42 42 45 48 53 54 56 60 65
   c) 9 11 8 4 6 2 14 6 4 3 9 10 5 6 Mode = 6 Median = 6
      2 3 4 4 5 6 6 8 9 9 10 11 14
   d) 114 120 104 118 97 110 89 114 Mode = 114 Median = 112
      89 97 104 110 114 114 118 120

Term 3 | Section 9 | Data Handling

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Question 5 | Bar Graphs

1. School ABC held an Inter-house Athletics Day. The bar graph shows the times recorded, in seconds, for the Grade 6 boy's 100m race.

   a) Who won the race? Matthew
   b) True or False? Jan and Sipho finished in tied second place. True
   c) Who finished second last? Shaun
   d) What was the slowest time? 18 s

   e) What is the difference between the winner's and the loser's time? 18 s - 13 s = 5 s
   f) What is the average time?

\[
\text{the sum of the times} = \frac{16 + 14 + 18 + 14 + 13}{5} = \frac{75}{5} = 15 s
\]

*2. The bar graph below shows the t-shirts sold at Entrepreneur's Day.

   The different sizes of black and white t-shirts sold

   a) Which is the most popular size? Medium
   b) How many small t-shirts are sold in total? 8 black + 12 white = 20 small t-shirts
   c) What % of the small t-shirts sold are black? \(\frac{8}{20} = 40\%\)
   d) What % of the small t-shirts sold are white? \(\frac{12}{20} = 60\%\)
   e) What fraction of the large t-shirts sold are white?

\[
\frac{8}{14} = \frac{4}{7}
\]
   f) How many t-shirts are sold in total? 12 XS + 20 S + 30 M + 14 L + 8 XL = 84 t-shirts
   g) What fraction of the total t-shirts sold are medium?

\[
\frac{30}{84} = \frac{15}{42} = \frac{5}{14}
\]
   h) What fraction of the total t-shirts sold are black?

\[
\frac{36}{84} = \frac{18}{42} = \frac{3}{7}
\]
   i) If Sally made a profit of R25 per t-shirt, how much profit did she make in total?

R25 × 84 = R2100
1. The pie chart shows the favourite colours of 128 learners in ABC Primary School.

<table>
<thead>
<tr>
<th>Favourite Colour</th>
<th>Number of Learners</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blue</td>
<td>64</td>
</tr>
<tr>
<td>Red</td>
<td>32</td>
</tr>
<tr>
<td>Green</td>
<td>16</td>
</tr>
<tr>
<td>Purple</td>
<td>16</td>
</tr>
</tbody>
</table>

a) What percentage of the learners chose blue? **50%**
b) How many learners chose blue? \( \frac{1}{2} \) of 128 = 64

c) What fraction of the learners chose green? **\( \frac{1}{8} \)**
d) What percentage of the learners chose red? **25%**
e) How many learners chose red? \( \frac{1}{4} \) of 128 = 32

f) What percentage of the learners chose green or purple? **25%**

2. Complete:

- a) The area of P is \( \frac{1}{12} \) of area of the circle.
- b) The area of Q is \( \frac{5}{12} \) of area of the circle.
- c) The area of R is \( \frac{2}{12} \) or \( \frac{1}{6} \) of area of the circle.
- d) The area of S is \( \frac{3}{12} \) or \( \frac{1}{4} \) of area of the circle.

3. Complete:

- a) \( \frac{1}{4} \) of 48 000 = 12 000
- b) \( \frac{1}{3} \) of 240 000 = 80 000
- c) \( \frac{1}{4} \) of 360 000 = 90 000

\( \frac{1}{6} \) of 48 000 = 8 000
\( \frac{2}{3} \) of 240 000 = 160 000
\( \frac{1}{6} \) of 360 000 = 60 000

*4. The pie chart shows Johan’s annual expenditure on his farm. Examine the chart and then answer the following questions.

- a) Which expenditure item is the greatest? **Implements**
- b) What fraction of the expenditure is on fertiliser? \( \frac{2}{12} = \frac{1}{6} \)
- c) What percentage of the expenditure is on wages? \( \frac{3}{12} = \frac{1}{4} = 25\% \)
- d) If the total expenditure is R360 000, how much is spent on:
  - i) wages? \( \frac{1}{4} \) * of R360 000 = R90 000
  - ii) fertiliser? \( \frac{1}{6} \) of R360 000 = R60 000
  - ii)* implements? \( \frac{5}{12} \) of R360 000 = R150 000
1. The pie chart below shows how 100 stickers are shared amongst a group of children.

   ![](image)

   a) Which child received \( \frac{1}{2} \) of the stickers? \( \text{Thandi} \)

   b) What percentage of the stickers did Thato receive? \( \frac{20}{100} = 20\% \)

   c) Which learner(s) received 10% of the stickers? \( \text{Ruth, Pete & Alice} \)

2. The pie chart below shows how 50 marbles are shared amongst a group of children.

   ![](image)

   a) How many marbles did Susan receive? 25

   b) Patrick received 10% of the marbles. \( \text{True} \)

   c) What percentage of the marbles did Gia, Jim and Amy receive altogether? \( \frac{15}{50} = 30\% \)

3. This pie chart indicates how 24 prizes were awarded to five athletes.

   ![](image)

   a) Who received 6 prizes? \( \text{Junior} \)

   b) How many prizes did Zandi receive? \( 24 - 21 = 3 \) prizes

   c) What fraction of the prizes did Paul receive? \( \frac{9}{24} = \frac{3}{8} \)

   d)* What percentage of the prizes did Junior receive? \( \frac{6}{24} = \frac{1}{4} \) and \( \frac{1}{4} \times 100 = 25\% \)

4. This pie chart indicates how 120 gold stars were awarded to five Grade 6 learners.

   ![](image)

   a) Who received the most stars? \( \text{Zara} \)

   b) Calculate how many stars JP received. \( 120 - 110 = 10 \) stars

   c)* What percentage of the stars did Peter receive? \( \frac{30}{120} = \frac{1}{4} \) and \( \frac{1}{4} \times 400 = 25\% \)

   d)* What percentage of the stars did Lea receive? \( \text{Hint: Peter got 25% of the stars} \)

   \( \text{therefore Lea got 12.5% or 12\frac{1}{2}%,} \)
Section 10: Numeric Patterns

Question 1 | Flow Diagrams: Missing Inputs and Outputs

1. Complete the flow diagrams below.
   a) \[
   \begin{array}{c}
   11 \\
   20 \\
   37 \\
   69 \\
   \end{array}
   \begin{array}{c}
   -9 \\
   x7 \\
   \end{array}
   \begin{array}{c}
   14 \\
   196 \\
   \end{array}
   \]
   b) \[
   \begin{array}{c}
   9 \\
   10 \\
   15 \\
   22 \\
   \end{array}
   \begin{array}{c}
   \times8 \\
   +7 \\
   \end{array}
   \begin{array}{c}
   79 \\
   87 \\
   127 \\
   183 \\
   \end{array}
   \]

2. Complete the flow diagrams below.
   a) \[
   \begin{array}{c}
   22 \\
   31 \\
   85 \\
   130 \\
   \end{array}
   \begin{array}{c}
   +5 \\
   \times3 \\
   \end{array}
   \begin{array}{c}
   9 \\
   12 \\
   30 \\
   45 \\
   \end{array}
   \]
   b) \[
   \begin{array}{c}
   5 \\
   9 \\
   12 \\
   20 \\
   \end{array}
   \begin{array}{c}
   \times9 \\
   -12 \\
   \end{array}
   \begin{array}{c}
   33 \\
   69 \\
   96 \\
   168 \\
   \end{array}
   \]

Question 2 | Flow Diagrams: Missing Rules

1. Fill in the missing rule in each flow diagram.
   a) \[
   \begin{array}{c}
   6 \\
   12 \\
   25 \\
   39 \\
   \end{array}
   \begin{array}{c}
   \times3 \\
   +18 \\
   \end{array}
   \begin{array}{c}
   24 \\
   30 \\
   43 \\
   57 \\
   \end{array}
   \]
   b) \[
   \begin{array}{c}
   42 \\
   66 \\
   81 \\
   126 \\
   \end{array}
   \begin{array}{c}
   \times2 \\
   \times9 \\
   \end{array}
   \begin{array}{c}
   14 \\
   22 \\
   27 \\
   42 \\
   \end{array}
   \]

2. Study. When considering the equal sign (=),
   the total on the left must always equal the total on the right.
   Examples:
   a) \((2 + 4) \times 3 = 18\) because \(6 \times 3 = 18\)
   b) \((3 \times 5) - 8 = 7\) because \(15 - 8 = 7\)
   c) \((50 + \_\_\_) \div 9 = 6\) because \(54 \div 9 = 6\)

3. Fill in the missing numbers.
   a) \((2 + 2) \times 3 = 12\)
   b) \((3 + 5) \times 4 = 32\)
   c) \((8 - 1) \times 2 = 14\)
   d) \((7 - 3) \times 9 = 36\)
   e) \((3 \times 2) + 7 = 13\)
   f) \((5 \times 9) - 8 = 37\)
   g) \((9 \div 3) + 5 = 8\)
   h) \((42 \div 6) - 5 = 5\)

4. Fill in the missing numbers.
   a) \((5 + 3) \times 2 = 16\)
   b) \((4 + 5) \times 7 = 63\)
   c) \((8 - 2) + 3 = 2\)
   d) \((15 - 3) \div 4 = 3\)
   e) \((7 \times \_\_\_) + 9 = 30\)
   f) \((5 \times \_\_\_) - 7 = 33\)
   g) \((10 \div 2) + 9 = 14\)
   h) \((56 \div \_\_\_) - 8 = 0\)
5. Fill in the missing part of each rule.

   a) 
   
   b) 
   
   c) 
   
   d) 

### Question 3 | Using Tables to Record Outputs with a Constant Difference of 2

1. Use the given rules to complete each table.

   A: Input $\rightarrow \times 2 \rightarrow$ Output

<table>
<thead>
<tr>
<th>Input</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output</td>
<td>2</td>
<td>4</td>
<td>6</td>
<td>8</td>
<td>10</td>
</tr>
</tbody>
</table>
   
   B: Input $\rightarrow \times 2 + 3 \rightarrow$ Output

<table>
<thead>
<tr>
<th>Input</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output</td>
<td>5</td>
<td>7</td>
<td>9</td>
<td>11</td>
<td>13</td>
</tr>
</tbody>
</table>

2. Study: A “constant difference of 2” means that the difference between each consecutive output is 2.

   Consider table B above. The outputs have a constant difference of 2. Therefore the first part of the rule is $\times 2$.

   However, the outputs are not multiples of 2. Therefore the rule is $\times 2 + 3$.

3. Complete:

   a) When outputs have a constant difference of 2, the first part of the rule is $\times 2$.

   b) Determine the rule for each table and then use it to fill in the missing numbers in each.

   A: Input $\rightarrow \times 2 \rightarrow$ Output

<table>
<thead>
<tr>
<th>Input</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>12</th>
<th>16</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output</td>
<td>2</td>
<td>4</td>
<td>6</td>
<td>8</td>
<td>24</td>
<td>32</td>
</tr>
</tbody>
</table>
   
   B: Input $\rightarrow \times 2 - 1 \rightarrow$ Output

<table>
<thead>
<tr>
<th>Input</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>10</th>
<th>15</th>
<th>30</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output</td>
<td>1</td>
<td>3</td>
<td>5</td>
<td>7</td>
<td>19</td>
<td>29</td>
<td>59</td>
</tr>
</tbody>
</table>

   C: Input $\rightarrow \times 2 + 2 \rightarrow$ Output

<table>
<thead>
<tr>
<th>Input</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>18</th>
<th>24</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output</td>
<td>4</td>
<td>6</td>
<td>8</td>
<td>10</td>
<td>38</td>
<td>50</td>
</tr>
</tbody>
</table>

   *D: Input $\rightarrow \times 2 - 2 \rightarrow$ Output

<table>
<thead>
<tr>
<th>Input</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>8</th>
<th>19</th>
<th>21</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output</td>
<td>0</td>
<td>2</td>
<td>4</td>
<td>6</td>
<td>10</td>
<td>36</td>
<td>40</td>
</tr>
</tbody>
</table>
**Question 4 | Using Tables to Record Outputs with a Constant Difference of 3**

1. Complete:
   a) Use the given rules to complete each table.

   **A:** Input $\rightarrow 3 \rightarrow$ Output
   
<table>
<thead>
<tr>
<th>Input</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output</td>
<td>3</td>
<td>6</td>
<td>9</td>
<td>12</td>
<td>15</td>
</tr>
</tbody>
</table>

   **B:** Input $\rightarrow 3 - 2 \rightarrow$ Output
   
<table>
<thead>
<tr>
<th>Input</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output</td>
<td>1</td>
<td>4</td>
<td>7</td>
<td>10</td>
<td>13</td>
</tr>
</tbody>
</table>

   b) When outputs have a constant difference of 3, the first part of the rule is $\times 3$.

2. Determine the rule for each table and then use it to fill in the missing numbers in each.

   **A:** Input $\rightarrow 3 + 3 \rightarrow$ Output
   
<table>
<thead>
<tr>
<th>Input</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>10</th>
<th>25</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output</td>
<td>6</td>
<td>9</td>
<td>12</td>
<td>15</td>
<td>33</td>
<td>78</td>
</tr>
</tbody>
</table>

   **B:** Input $\rightarrow 3 - 1 \rightarrow$ Output
   
<table>
<thead>
<tr>
<th>Input</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>7</th>
<th>10</th>
<th>18</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output</td>
<td>2</td>
<td>5</td>
<td>8</td>
<td>11</td>
<td>20</td>
<td>29</td>
<td>53</td>
</tr>
</tbody>
</table>

**Question 5 | Using Tables to Record Outputs: Mixed Questions**

1. Use the given rules to complete each table.

   **A:** Input $\rightarrow 8 - 5 \rightarrow$ Output
   
<table>
<thead>
<tr>
<th>Input</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output</td>
<td>3</td>
<td>11</td>
<td>19</td>
<td>27</td>
<td>35</td>
</tr>
</tbody>
</table>

   **B:** Input $\rightarrow 4 + 3 \rightarrow$ Output
   
<table>
<thead>
<tr>
<th>Input</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output</td>
<td>7</td>
<td>11</td>
<td>15</td>
<td>19</td>
<td>23</td>
</tr>
</tbody>
</table>

2. Complete:
   a) When outputs have a constant difference of 5, the first part of the rule is $\times 5$.
   b) When outputs have a constant difference of 7, the first part of the rule is $\times 7$.

3. Complete each table and rule.
   a) **Rule:** Input $\rightarrow 5 + 1 \rightarrow$ Output

<table>
<thead>
<tr>
<th>Input</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>10</th>
<th>12</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output</td>
<td>6</td>
<td>11</td>
<td>16</td>
<td>21</td>
<td>51</td>
<td>61</td>
</tr>
</tbody>
</table>

   b) **Rule:** Input $\rightarrow 9 - 1 \rightarrow$ Output

<table>
<thead>
<tr>
<th>Input</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>9</th>
<th>10</th>
<th>20</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output</td>
<td>8</td>
<td>17</td>
<td>26</td>
<td>35</td>
<td>50</td>
<td>89</td>
<td>179</td>
<td></td>
</tr>
</tbody>
</table>

   c) **Rule:** Input $\rightarrow 6 - 2 \rightarrow$ Output

<table>
<thead>
<tr>
<th>Input</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>8</th>
<th>15</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output</td>
<td>4</td>
<td>10</td>
<td>16</td>
<td>22</td>
<td>46</td>
<td>88</td>
</tr>
</tbody>
</table>

   d) **Rule:** Input $\rightarrow 7 + 3 \rightarrow$ Output

<table>
<thead>
<tr>
<th>Input</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>9</th>
<th>12</th>
<th>20</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output</td>
<td>10</td>
<td>17</td>
<td>24</td>
<td>31</td>
<td>66</td>
<td>87</td>
<td>143</td>
</tr>
</tbody>
</table>

   e) **Rule:** Input $\rightarrow 3 + 5 \rightarrow$ Output

<table>
<thead>
<tr>
<th>Input</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>13</th>
<th>30</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output</td>
<td>8</td>
<td>11</td>
<td>14</td>
<td>17</td>
<td>44</td>
<td>95</td>
</tr>
</tbody>
</table>

   f) **Rule:** Input $\rightarrow 4 - 3 \rightarrow$ Output

<table>
<thead>
<tr>
<th>Input</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>11</th>
<th>17</th>
<th>25</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output</td>
<td>1</td>
<td>5</td>
<td>9</td>
<td>13</td>
<td>41</td>
<td>65</td>
<td>97</td>
</tr>
</tbody>
</table>
Grade 6
Play! Mathematics
Answer Book

**Question 6** | Number Sequences  \([+ , \, -, \, \times , \, \div] \) of the Same Number

1. Complete each sequence. \(\text{Adding the same number.}\)
   a) \(1 ; 3 ; 5 ; 7 ; 9 \) \(+2\)
   b) \(1 ; 5 ; 9 ; 13 ; 17 \) \(+4\)
   c) \(7 ; 12 ; 17 ; 22 ; 27 \) \(+5\)
   d) \(8 ; 17 ; 26 ; 35 ; 44 \) \(+9\)
   e) \(10 ; 28 ; 46 ; 64 ; 82 \) \(+18\)
   f) \(18 ; 55 ; 132 ; 209 ; 286 \) \(+50\)

2. Complete each sequence. \(\text{Subtracting the same number.}\)
   a) \(14 ; 11 ; 8 ; 5 ; 2 \) \(-3\)
   b) \(31 ; 24 ; 17 ; 10 ; 3 \) \(-7\)
   c) \(93 ; 85 ; 77 ; 69 ; 61 \) \(-8\)
   d) \(100 ; 85 ; 70 ; 55 ; 40 \) \(-15\)
   e) \(81 ; 65 ; 49 ; 33 ; 17 \) \(-16\)
   f) \(183 ; 158 ; 133 ; 108 ; 83 \) \(-25\)

3. Complete each sequence. \(\text{Multiplying by the same number.}\)
   a) \(2 ; 4 ; 8 ; 16 ; 32 \) \(\times2\)
   b) \(6 ; 12 ; 24 ; 48 ; 96 \) \(\times2\)
   c) \(3 ; 9 ; 27 ; 81 ; 243 \) \(\times3\)
   d) \(20 ; 60 ; 180 ; 540 \) \(\times3\)
   e) \(75 ; 150 ; 300 ; 600 ; 1200 \) \(\times2\)
   f) \(3 ; 12 ; 48 ; 192 ; 768 \) \(\times4\)

4. Complete each sequence. \(\text{Dividing by the same number.}\)
   a) \(64 ; 32 ; 16 ; 8 ; 4 \) \(\div2\)
   b) \(80 ; 40 ; 20 ; 10 ; 5 \) \(\div2\)
   c) \(480 ; 240 ; 120 ; 60 ; 30 \) \(\div2\)
   d) \(243 ; 81 ; 27 ; 9 ; 3 \) \(\div3\)
   e) \(486 ; 162 ; 54 ; 18 ; 6 \) \(\div3\)
   f) \(1215 ; 405 ; 135 ; 45 ; 15 \) \(\div3\)

4. Complete each sequence. \(\text{[Mixed Questions]}\)
   a) \(87 ; 78 ; 69 ; 60 ; 51 \) \(-9\)
   b) \(2 ; 6 ; 18 ; 54 ; 162 \) \(\times3\)
   c) \(53 ; 72 ; 91 ; 110 ; 129 \) \(\times19\)
   d) \(400 ; 200 ; 100 ; 50 ; 25 \) \(\div2\)
   e) \(172 ; 147 ; 122 ; 97 \) \(\div25\)
   f) \(768 ; 192 ; 48 ; 12 \) \(\div3\)

**Question 7** | Number Sequences  \([+ \, or \, -] \) Different Numbers

1. Study the sequence below in which the pattern of dots form triangles.
   ![Triangular Numbers]

   Sequence: \(1 ; \, 3 ; \, 6 ; \, 10 ; \, 15 ; \, 21 \)

   Each step, we add another row of dots to form the next triangle.

2. Complete each sequence. \(\text{Adding or subtracting a different number.}\)
   a) \(1 ; 3 ; 6 ; 10 ; 15 ; 21 \)
   b) \(3 ; 7 ; 12 ; 18 ; 25 ; 33 \)
   c) \(30 ; 29 ; 27 ; 24 ; 20 ; 15 \)
   d) \(4 ; 6 ; 10 ; 16 ; 24 ; 34 \)
   e) \(41 ; 39 ; 35 ; 29 ; 21 ; 11 \)
   f) \(2 ; 5 ; 10 ; 17 ; 26 ; 37 \)
Question 8 | Number Sequences  [Two patterns in one]

1. Study the example: 1 ; 2 ; 4 ; 8 ; 4 ; 16 ; 5

   We have “two patterns in one”. → 1 ; 2 ; 4 ; 8 ; 4 ; 16 ; 5 [ +1 ]
   → ; 2 ; 4 ; 8 ; 16 ; [ ×2 ]

   Hint: In patterns like this, the numbers get bigger then smaller, bigger then smaller and vice versa.

2. Complete each sequence.
   a) 1 ; 2 ; 4 ; 8 ; 16 ; 32
   b) 1 ; 8 ; 2 ; 7 ; 3 ; 4
   c) 2 ; 4 ; 8 ; 16 ; 32
   d) 10 ; 1 ; 3 ; 2 ; 6 ; 3

Question 9 | Square Numbers

1. Study the sequence below in which the pattern of dots form squares.

   Sequence: 1 ; 4 ; 9 ; 16 ; 25 ; 36 ...  

2. Calculate the first 15 square numbers.
   a) 1 × 1 = 1
   b) 2 × 2 = 4
   c) 3 × 3 = 9
   d) 4 × 4 = 16
   e) 5 × 5 = 25
   f) 6 × 6 = 36
   g) 7 × 7 = 49
   h) 8 × 8 = 64
   i) 9 × 9 = 81
   j) 10 × 10 = 100
   k) 11 × 11 = 121
   l) 12 × 12 = 144
   m) 13 × 13 = 169
   n) 14 × 14 = 196
   p) 15 × 15 = 225

3. Complete each sequence.
   a) 1 ; 4 ; 9 ; 16 ; 25 ; 36 ; 49 ; 64
   b) 1 ; 2 ; 4 ; 8 ; 16 ; 32

Question 10 | Number Sequences  [Mixed Questions]

1. Complete each sequence.
   a) 96 ; 48 ; 24 ; 12 ; 6 ; 3
   b) 180 ; 165 ; 150 ; 135 ; 120
   c) 2 ; 6 ; 12 ; 20 ; 30 ; 42
   d) 5 ; 15 ; 45 ; 135 ; 405
   e) 40 ; 39 ; 37 ; 34 ; 30 ; 25
   f) 1 ; 1 ; 3 ; 2 ; 5 ; 3 ; 7
   g) 98 ; 103 ; 108 ; 113
   h) 1 ; 4 ; 9 ; 16 ; 25 ; 36
   i) 1 ; 2 ; 4 ; 8 ; 16 ; 32
Question 11 | Fibonacci Sequences

1. Study: 1 ; 1 ; 2 ; 3 ; 5 ; 8 ; 13 …  Each term is the sum of the previous two terms. This is called a Fibonacci sequence.

2. Complete each Fibonacci sequence.
   a) 1 ; 1 ; 2 ; 3 ; 5 ; 8 ; 13.
   b) 1 ; 3 ; 4 ; 7 ; 11 ; 18 ; 29.
   c) 2 ; 4 ; 6 ; 10 ; 16 ; 26 ; 42.
   d) 2 ; 5 ; 7 ; 12 ; 19 ; 31.
   e) 2 ; 3 ; 5 ; 8 ; 13 ; 21 ; 34.
   f) 4 ; 5 ; 9 ; 14 ; 23 ; 37 ; 60.

Question 12 | Number Sequences [Mixed Questions]

1. Complete each sequence.
   a) 2 ; 5 ; 4 ; 8 ; 6 ; 11 ; 8 ; 14.
   b) 9 ; 19 ; 39 ; 69 ; 109 ; 159.
   c) 11 ; 22 ; 44 ; 88 ; 176 ; 352 ; x²
   d) 100 ; 81 ; 64 ; 49 ; 36 ; 25.
   e) 1 ; 1 ; 2 ; 3 ; 5 ; 8 ; 13 ; 21 ; 34.
   f) 972 ; 324 ; 108 ; 36 ; 12 ; 4 .
   g) 2 ; 6 ; 12 ; 20 ; 30 ; 42.
   h) 250 ; 225 ; 200 ; 175 ; 150 ; 125 ; -25

Question 13 | Number Sequences [Decimal Fractions]

1. Study the sequence below.
   a) 1.6 ; 1.8 ; 2.0 ; 2.2 ; 2.4 ; 2.6. Adding 0.2 tenths.
   b) 5.0 ; 4.6 ; 4.2 ; 3.8 ; 3.4 ; 3.0. Subtracting 0.4 tenths.
   c) 3.2 ; 2.9 ; 2.6 ; 2.3 ; 2.0 ; 1.7 ; 1.4. -0.3
   d) 3.9 ; 4.8 ; 5.7 ; 6.6 ; 7.5 ; 8.4. +0.9
   e) 8.4 ; 7.6 ; 6.8 ; 6.0 ; 5.2 ; 4.4. -0.8
   f) 8.0 ; 7.1 ; 6.2 ; 5.3 ; 4.4 ; 3.5 ; 2.6. -0.9

Question 14 | Number Sequences [Common Fractions]

1. Complete each sequence.
   a) \( \frac{1}{7} \) ; \( \frac{3}{7} \) ; \( \frac{5}{7} \) ; \( \frac{7}{7} \).
   b) \( \frac{1}{2} \) ; \( \frac{1}{4} \) ; \( \frac{1}{8} \) ; \( \frac{1}{16} \).
   c) \( \frac{0}{3} \) ; \( \frac{2}{3} \) ; \( \frac{3}{3} \) ; \( \frac{1}{3} \) ; \( \frac{2}{3} \) ; \( \frac{3}{3} \) ; \( \frac{1}{3} \) ; \( \frac{2}{3} \) ; \( \frac{3}{3} \) .
   d) \( \frac{1}{5} \) ; \( \frac{1}{13} \) ; \( \frac{1}{11} \) ; \( \frac{1}{9} \) ; \( \frac{1}{7} \) .
   e) \( \frac{1}{6} \) ; \( \frac{1}{2} \) ; \( \frac{5}{6} \) .
   f) \( \frac{1}{12} \) ; \( \frac{1}{6} \) ; \( \frac{4}{12} \) ; \( \frac{5}{12} \) ; \( \frac{6}{12} \) .
   NB: \( \frac{1}{2} = \frac{3}{6} \) and \( \frac{1}{3} = \frac{3}{12} \).

2. Complete each sequence.
   a) \( 7 \frac{1}{2} ; 15 ; 30 ; 60 ; 120 \) ; x²
   b) 200 ; 100 ; 50 ; \( 25 ; 12 \frac{1}{2} \) ; +2
   c) \( \frac{1}{8} \) ; \( \frac{1}{4} \) ; \( \frac{1}{2} \) ; \( \frac{1}{2} ; 1 \) ; \( 1 ; 2 ; 4 \) ; x²
   d) \( 8 ; 4 \) ; \( \frac{1}{2} ; \frac{1}{4} ; \frac{1}{8} \) ; \( 256 ; 64 ; 16 \) ; \( 4 ; 1 \) ; \( \frac{1}{2} +4 \)
   e) \( 256 ; 64 ; 16 \) ; \( 4 ; 1 \) ; \( \frac{1}{2} +4 \)
   f) \( 500 ; 100 ; 20 ; 4 ; \frac{4}{5} \) ; +5
Section 11: Length

**Question 1**  | Converting between mm, cm, m and km

1. Study: \[\text{km} \rightarrow \text{m} \rightarrow \text{cm} \rightarrow \text{mm}\]

<table>
<thead>
<tr>
<th>Example</th>
<th>Conversion</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) 1,5 km = 1500 m</td>
<td>because 1,5 \times 1000 = 1500</td>
</tr>
<tr>
<td>b) 0,75 m = 75 cm</td>
<td>because 0,75 \times 100 = 75</td>
</tr>
<tr>
<td>c) 10,2 cm = 102 mm</td>
<td>because 10,2 \times 10 = 102</td>
</tr>
<tr>
<td>d) 3,06 m = 3060 mm</td>
<td>because 3,06 \times 1000 = 3060</td>
</tr>
</tbody>
</table>

2. Complete:
- a) 1 km = 1000 m
- b) 4 km = 4000 m
- c) 2,5 km = 2500 m
- d) 7,03 km = 7030 m
- e) 0,8 km = 800 m
- f) 12 km = 12000 m

3. Complete:
- a) 1 m = 100 cm
- b) 7 m = 700 cm
- c) 4,1 m = 410 cm
- d) 0,9 m = 90 cm
- e) 15 m = 1500 cm
- f) 3,07 m = 307 cm

4. Complete:
- a) 1 cm = 10 mm
- b) 9 cm = 90 mm
- c) 3,8 cm = 38 mm
- d) 14 cm = 140 mm
- e) 18,5 cm = 185 mm
- f) 24,9 cm = 249 mm

5. Complete:
- a) 1 m = 1000 mm
- b) 8,2 m = 8200 mm
- c) 0,75 m = 750 mm
- d) 4,03 m = 4030 mm
- e) 0,09 m = 90 mm
- f) 23,5 m = 23500 mm

6. Complete: [Mixed Questions]
- a) 9,3 m = 930 cm
- b) 0,5 m = 50 cm
- c) 5,8 cm = 58 mm
- d) 32 km = 32000 m
- e) 0,14 m = 140 mm
- f) 24 cm = 240 mm
- g) 1,25 m = 1250 mm
- h) 0,09 m = 9 cm

7. Study: \[\text{mm} \rightarrow \text{cm} \rightarrow \text{m} \rightarrow \text{km}\]

<table>
<thead>
<tr>
<th>Example</th>
<th>Conversion</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) 40 mm = 4 cm</td>
<td>because 40 \div 10 = 4</td>
</tr>
<tr>
<td>b) 720 cm = 7,2 m</td>
<td>because 720 \div 100 = 7,2</td>
</tr>
<tr>
<td>c) 1080 m = 1,08 km</td>
<td>because 1080 \div 1000 = 1,08</td>
</tr>
<tr>
<td>d) 250 mm = 0,25 m</td>
<td>because 250 \div 1000 = 0,25</td>
</tr>
</tbody>
</table>

8. Complete:
- a) 10 mm = 1 cm
- b) 30 mm = 3 cm
- c) 25 mm = 2,5 cm
- d) 32 mm = 3,2 cm
- e) 400 mm = 40 cm
- f) 873 mm = 87,3 cm

9. Complete:
- a) 100 cm = 1 m
- b) 420 cm = 4,2 m
- c) 759 cm = 7,59 m
- d) 83 cm = 0,83 m
- e) 60 cm = 0,6 m
- f) 7 cm = 0,07 m

10. Complete:
- a) 1000 m = 1 km
- b) 3700 m = 3,7 km
- c) 800 m = 0,8 km
- d) 3060 m = 3,06 km
- e) 12 m = 0,12 km
- f) 750 m = 0,75 km

11. Complete:
- a) 2000 mm = 2 m
- b) 6500 mm = 6,5 m
- c) 300 mm = 0,3 m
- d) 1785 mm = 1,785 m
- e) 90 mm = 0,09 m
- f) 1 mm = 0,001 m

12. Complete: [Mixed Questions]
- a) 600 m = 0,6 km
- b) 247 cm = 2,47 m
- c) 75 mm = 0,075 m
- d) 25000 m = 25 km
- e) 9 cm = 0,09 m
- f) 300 mm = 30 cm
### Question 2 | Working with Fractions

1. Study the table:

<table>
<thead>
<tr>
<th>Term</th>
<th>Section 11</th>
<th>Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>a)</td>
<td>250m</td>
<td>(\frac{1}{4}) km</td>
</tr>
<tr>
<td>b)</td>
<td>500m</td>
<td>(\frac{3}{4}) km</td>
</tr>
<tr>
<td>c)</td>
<td>750m</td>
<td>(\frac{5}{4}) km</td>
</tr>
</tbody>
</table>

2. Study the table:

<table>
<thead>
<tr>
<th>Term</th>
<th>Section 11</th>
<th>Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>a)</td>
<td>100m</td>
<td>(\frac{1}{10}) km</td>
</tr>
<tr>
<td>b)</td>
<td>300m</td>
<td>(\frac{9}{10}) km</td>
</tr>
<tr>
<td>c)</td>
<td>800m</td>
<td>(\frac{4}{5}) km</td>
</tr>
</tbody>
</table>

3. Study the table:

<table>
<thead>
<tr>
<th>Term</th>
<th>Section 11</th>
<th>Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>a)</td>
<td>25cm</td>
<td>(\frac{1}{4}) m</td>
</tr>
<tr>
<td>b)</td>
<td>50cm</td>
<td>(\frac{1}{2}) m</td>
</tr>
<tr>
<td>c)</td>
<td>60cm</td>
<td>(\frac{3}{5}) m</td>
</tr>
</tbody>
</table>

4. Complete:

a) \(\frac{1}{2}\) km = \(\frac{500}{2}\) m = 500 m
b) \(\frac{1}{4}\) km = \(\frac{250}{4}\) m = 62.5 m
c) \(\frac{1}{5}\) km = \(\frac{200}{5}\) m = 40 m
d) \(\frac{3}{4}\) km = \(\frac{2750}{4}\) m = 687.5 m

5. Complete:

<table>
<thead>
<tr>
<th>Term</th>
<th>Section 11</th>
<th>Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>a)</td>
<td>(\frac{1}{2}) m = 0.5 m</td>
<td></td>
</tr>
<tr>
<td>b)</td>
<td>(\frac{1}{4}) m = 0.25 m</td>
<td></td>
</tr>
<tr>
<td>c)</td>
<td>(\frac{3}{4}) m = 1.75 m</td>
<td></td>
</tr>
<tr>
<td>d)</td>
<td>(\frac{3}{5}) m = 0.6 m</td>
<td></td>
</tr>
</tbody>
</table>

### Question 3 | Writing length in mm, cm, m or km

1. Remember:

\[
\times 1000 \quad \times 100 \quad \times 10 \quad \div 10 \quad \div 100 \quad \div 1000
\]

\[
\text{km} \rightarrow \text{m} \rightarrow \text{cm} \rightarrow \text{mm} \quad \text{and} \quad \text{mm} \rightarrow \text{cm} \rightarrow \text{m} \rightarrow \text{km}
\]

2. Complete:

a) 2 km = \(\frac{2000}{1000}\) m = 2000 m
b) 60 mm = \(\frac{60}{10}\) cm = 6 cm
c) 1.08 km = \(\frac{1080}{1000}\) m = 1080 m
d) 5 m = \(\frac{5000}{1000}\) mm = 5000 mm
e) 7000 cm = \(\frac{7000}{100}\) m = 70 m
f) 4500 m = \(\frac{4500}{1000}\) km = 4.5 km
g) \(\frac{1}{2}\) m = \(\frac{50}{10}\) cm = 50 cm
h) 4003 m = \(\frac{4003}{1000}\) mm = 4003 mm
i) 600 mm = \(\frac{600}{10}\) cm = 60 cm
j) 12 cm = \(\frac{120}{10}\) mm = 120 mm
k) 790 mm = \(\frac{790}{10}\) cm = 79 cm
l) 2½ cm = \(\frac{2.5}{1}\) mm = 25 mm

3. Complete:

a) \(140 \text{ cm} = \frac{140}{100} \text{ cm} = 1.4 \text{ dm} = 14 \text{ dm} \times 10 \text{ mm}
\)
<table>
<thead>
<tr>
<th>Term</th>
<th>Section 11</th>
<th>Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>b)</td>
<td>23.95 m = (\frac{2395}{100}) m = 23.95 m</td>
<td></td>
</tr>
<tr>
<td>c)</td>
<td>72 800 mm = (\frac{72800}{1000}) m = 72.8 m</td>
<td></td>
</tr>
<tr>
<td>d)</td>
<td>315 km = (\frac{315}{1000}) km = 315 000 m</td>
<td></td>
</tr>
</tbody>
</table>

4. Circle the correct answer in each.

4.1. 150 m = ……………

a) 1500 mm  

b) 1,05 cm  

c) 0,15 km  

d) \(\frac{1}{5}\) km

4.2. 1,2 m + \(\frac{1}{2}\) m = ……………

\(1.2m + 0.5m = 1.7m = 170cm = 1700mm\)

a) 1,212 m  

b) 170 cm  

c) 17 000 mm  

d) 1,25 m

5. Study:

\(1 \text{ km} = 100 \text{ 000 mm}\)

\(1 \text{ km} = 1 \text{ 000 000 mm}\)

6. Complete:

<table>
<thead>
<tr>
<th>Term</th>
<th>Section 11</th>
<th>Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>a)</td>
<td>1 km = (\frac{100000}{10}) cm = 10000 cm</td>
<td></td>
</tr>
<tr>
<td>b)</td>
<td>5 km = (\frac{500000}{10}) cm = 50000 cm</td>
<td></td>
</tr>
<tr>
<td>c)</td>
<td>1 km = (\frac{1000000}{10}) mm = 100000 mm</td>
<td></td>
</tr>
<tr>
<td>d)</td>
<td>2,3 km = (\frac{2300000}{10}) mm = 2300000 mm</td>
<td></td>
</tr>
<tr>
<td>e)</td>
<td>400 000 cm = (\frac{400000}{10}) km = 40 km</td>
<td></td>
</tr>
<tr>
<td>f)</td>
<td>7 500 000 mm = (\frac{7500000}{10}) km = 75 km</td>
<td></td>
</tr>
</tbody>
</table>

Term 4 | Section 11 | Length

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1. Fill in >, < or = to make correct statements.
   a) 1,5 km > 150 m
   b) 2,3 cm = 23 mm
   c) 800 m > 0,08 km
   d) 0,2 km < ¼ km
   e) 7849 mm < 7,894 m
   f) 25 cm > 205 mm
   g) 1 m < 0,01 km
   h) 15 cm = 0,15 m
   i) 749 m < ¾ km

2. Order the lengths in ascending order.
   a) 2,59 km 2,09 km 2059 m 2 ¼ km
      2590 m 2090 m 2059 m 2500 m
   b) 5m 5cm 5,4m 509cm
      505cm 5,09m 535cm

3. Order the lengths in descending order.
   a) 7,6cm 79mm 7,1cm 7½ cm
      78mm 79mm 71mm 75mm
   b) ¾ km 0,34km 43m 0,8km
      750 m 340 m 43m 800m

Question 5 | Adding and Subtracting Length

1. Study: When adding or subtracting lengths, first make sure that the units are the same.

Option 1:
\[
\begin{align*}
2,5 \text{ km} + 745 \text{ m} &= 2500 \text{ m} + 745 \text{ m} = 3245 \text{ m} \\
&= 3.245 \text{ km}
\end{align*}
\]

Option 2:
\[
\begin{align*}
245 \text{ m} + 0,745 \text{ km} &= 245 \text{ m} + 745 \text{ m} = 1000 \text{ m} \\
&= 1 \text{ km}
\end{align*}
\]

2. Complete: a) Find the sum of 1,745 km and 387 m. \[1745m + 387m = 2132m = 2,132km\]
   b) Calculate the difference between 2,75 m and 831 mm. \[2750mm - 831mm = 1919mm = 1,919m\]
   c) Add 1m 8cm, 0,5m and 75cm. \[108cm + 50cm + 75cm = 233cm = 2,33m\]

3. How much longer is a 6,25m rope than a 4712mm rope?
   Give your answer in metres. \[6,250m - 4,712m = 1,538m\]

4. Donovan is 1,79m tall and Shaun is 12cm taller than Donovan.
   How tall is Shaun? \[1,79m + 0,12m = 1,91m = 191cm\]

5. Three distances total 1 km. The first distance is 245 m and the second is 0,6 km.
   Calculate the third distance. \[1000m - (245m + 600m) = 1000m - 845m = 155m\]

6. Sandy has a 10 metre roll of ribbon.
   She uses 2½ m, 80 cm and 1m 15cm. How much ribbon is left on the roll?
   \[2,5m + 0,8m + 1,15m = 4,45m\] \[10,00m - 4,45m = 5,55m = 555cm\]
**Question 6 | Multiplying Length (Rate)**

1. Complete:  
   a) \(1.5 \text{ km} \times 10 = 15 \text{ km}\)  
   b) \(0.8 \text{ m} \times 10 = 8 \text{ m}\)  
   c) \(0.48 \text{ km} \times 10 = 4.8 \text{ km}\)  
   d) \(3.6 \text{ m} \times 100 = 360 \text{ m}\)  

2. Complete:  
   a) \(1.5 \text{ km} \times 2 = 1500 \text{ m} \times 2 = 3000 \text{ m} = 3 \text{ km}\)  
   b) \(2.5 \text{ km} \times 4 = 2500 \text{ m} \times 4 = 10000 \text{ m} = 10 \text{ km}\)  
   c) \(1.2 \text{ m} \times 3 = 120 \text{ cm} \times 3 = 360 \text{ cm} = 3.6 \text{ m}\)  
   d) \(2.4 \text{ cm} \times 5 = 24 \text{ mm} \times 5 = 120 \text{ mm} = 12 \text{ cm}\)  

3. The length of 1 piece of wood is 1.2m. What is the length of 3 pieces of wood?  
   \(120 \text{ cm} \times 3 = 360 \text{ cm} = 3.6 \text{ m}\)

4. Rudolph connects 5 pipes together. Each pipe is 12.8cm long. How long is the connected pipe in centimetres?  
   \(128 \text{ mm} \times 5 = 640 \text{ mm} = 64 \text{ cm}\)

5. Mom walks 2.5 km every day. A) How far does Mom walk in 4 days?  
   \(2500 \text{ m} \times 4 = 10000 \text{ m} = 10 \text{ km}\)
   B) How far does Mom walk in 10 days?  
   \(2.5 \text{ km} \times 10 = 25 \text{ km}\)

6. Giulio swims 4.2 km every day. A) How far does he swim in 3 days?  
   \(4200 \text{ m} \times 3 = 12600 \text{ m} = 12.6 \text{ km}\)
   B) How far does he swim in a season of 100 days?  
   \(4.2 \text{ km} \times 100 = 420 \text{ km}\)

7. TBC Constructions built a 4 storey building. If the height of each storey is 3.25m, how high is the building in metres?  
   \(325 \text{ cm} \times 4 = 1300 \text{ cm} = 13 \text{ m}\)

**Question 7 | Dividing Length [into an equal number of parts]**

1. Complete:  
   a) \(1 \text{ m} \div 4 = 1000 \text{ mm} \div 4 = 250 \text{ mm}\)  
   b) \(1 \text{ m} \div 2 = 100 \text{ cm} \div 2 = 50 \text{ cm}\)  
   c) \(1.5 \text{ m} \div 3 = 1500 \text{ mm} \div 3 = 500 \text{ mm}\)  
   d) \(2 \text{ m} \div 4 = 2000 \text{ mm} \div 4 = 500 \text{ mm}\)  
   e) \(2.5 \text{ m} \div 5 = 250 \text{ cm} \div 5 = 50 \text{ cm}\)  
   f) \(7.2 \text{ km} \div 8 = 7200 \text{ m} \div 8 = 900 \text{ m}\)

2. A rope which is 1.5m long must be cut into three equal pieces. How long, in cm, must each piece of rope be? Length of each piece = 150 \text{ cm} \div 3 = 50 \text{ cm}

3. A 1.2m ribbon must be cut into four equal pieces. How long (in m) must each piece of ribbon be? \(1200 \text{ mm} \div 4 = 300 \text{ mm} = 0.3 \text{ m}\)

4. A two metre plank of wood must be cut in five equal pieces. How long (in mm) must each piece of wood be? \(2000 \text{ mm} \div 5 = 400 \text{ mm}\)

5. Thato must run 6km over 4 days. How far (in km) must Thato run each day? The same distance must be run each day. \(6000 \text{ m} \div 4 = 1500 \text{ m} = 1.5 \text{ km}\)

6. Catherine must swim 4.2km over 3 days. How far (in km) must she swim each day? She must swim equal daily distances. \(4200 \text{ m} \div 3 = 1400 \text{ m} = 1.4 \text{ km}\)
**Question 8 | Dividing “Length by Length”**

1. Complete:  
   a) \(20\text{cm} \div 40\text{mm} = \frac{200\text{mm}}{40\text{mm}} = 5\)  
   b) \(10\text{cm} \div 25\text{mm} = \frac{100\text{mm}}{25\text{mm}} = 4\)  
   c) \(2\text{m} \div 10\text{cm} = \frac{200\text{cm}}{10\text{cm}} = 20\)  
   d) \(1.5\text{m} \div 50\text{cm} = \frac{150\text{cm}}{50\text{cm}} = 3\)  

   NB: There are no units in the answer.

2. How many pieces of rope, each 50mm long, can be cut from a rope which is 35cm long?  
   Number of pieces of rope = \(350\text{mm} \div 50\text{mm} = 7\)

3. How many pieces of rope, each 25mm long, can be cut from a rope which is 10cm long?  
   Number of pieces of rope = \(100\text{mm} \div 25\text{mm} = 4\)

4. How many pieces of wood, each 20cm long, can be cut from a plank which is 1m long?  
   Number of pieces of wood = \(100\text{cm} \div 20\text{cm} = 5\)

5. How many pieces of string, each 25cm long, can be cut from a 1.5m roll of string?  
   Number of pieces of string = \(150\text{cm} \div 25\text{cm} = 6\)

6. Complete:  
   a) \(2\text{km} \div 500\text{m} = \frac{2000\text{m}}{500\text{m}} = 4\)  
   b) \(1.5\text{km} \div 50\text{m} = \frac{1500\text{m}}{50\text{m}} = 30\)  
   c) \(1\text{km} \div 200\text{m} = \frac{1000\text{m}}{200\text{m}} = 5\)  
   d) \(3\text{km} \div 250\text{m} = \frac{3000\text{m}}{250\text{m}} = 12\)  

   NB: There are no units in the answer.

7. Once around an athletics track is 400m.  
   How many times must an athlete run around the track to cover a distance of:  
   a) \(2\text{km}\)? \(2000\text{m} \div 400\text{m} = 5\) times around  
   b) \(1.2\text{km}\)? \(1200\text{m} \div 400\text{m} = 3\) times  
   c) \(4\text{km}\)? \(4000\text{m} \div 400\text{m} = 10\) times  
   d) \(10\text{km}\)? \(10000\text{m} \div 400\text{m} = 25\) times

8. One length of a swimming pool is 50m.  
   How many lengths must Nathania swim to cover  
   a) \(1.5\text{km}\)? \(1500\text{m} \div 50\text{m} = 30\) lengths  
   b) \(4\text{km}\)? \(4000\text{m} \div 50\text{m} = 80\) lengths

9. JP is a sprinter. He must run 250m sprints during training.  
   How many sprints must he run to run a total of 3km? \(3000\text{m} \div 250\text{m} = 12\) sprints

**Question 9 | Price per Metre**

1. Study: If it costs R65 for 1 metre of material, we write this as \(R65/\text{m}\).  
   What is the cost of 3 metres of the material?  
   Answer: \(R65 \times 3 = R195\)

2. Complete the table.

<table>
<thead>
<tr>
<th>Material</th>
<th>Price per m</th>
<th>2 m</th>
<th>10 m</th>
<th>15 m</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) Denim</td>
<td>R98/m</td>
<td>R196</td>
<td></td>
<td></td>
</tr>
<tr>
<td>b) Satin</td>
<td>R135/m</td>
<td>R270</td>
<td>R1350</td>
<td>R2025</td>
</tr>
</tbody>
</table>
Grade 6  Play! Mathematics  Answer Book

3. In the following examples the price/m includes Rands and cents.  

<table>
<thead>
<tr>
<th>Material A costs R12,50/m.</th>
<th>Material B costs R5,75/m.</th>
<th>Material B costs R49,75/m.</th>
</tr>
</thead>
<tbody>
<tr>
<td>What will 3m cost?</td>
<td>What will 12m cost?</td>
<td>What will 10m cost?</td>
</tr>
<tr>
<td>Answer: R12,50 × 3</td>
<td>Answer: R5,75 × 12</td>
<td>Answer: R49,75 × 10</td>
</tr>
<tr>
<td>1250c × 3</td>
<td>575c × 12</td>
<td>4975c × 10</td>
</tr>
<tr>
<td>3750c</td>
<td>6900c</td>
<td>R497,50</td>
</tr>
<tr>
<td>= R37,50</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: In Grade 7 we will learn how to multiply decimal fractions (e.g. 5,75 × 12) using the vertical column method.

4. Calculate the cost of: 

<table>
<thead>
<tr>
<th>Material A costs R12,50/m.</th>
<th>Material B costs R5,75/m.</th>
<th>Material B costs R49,75/m.</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 metres of material</td>
<td>2 metres of material</td>
<td>10 metres of material</td>
</tr>
<tr>
<td>at R7,50/m.</td>
<td>at R29,45/m.</td>
<td>at R87,99/m.</td>
</tr>
<tr>
<td>Answer: 750c × 3</td>
<td>Answer: 2945c × 2</td>
<td>Answer: 8799c × 10</td>
</tr>
<tr>
<td>= 2250c</td>
<td>= 5890c</td>
<td>= R879,90</td>
</tr>
<tr>
<td>= R22,50</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

5. In following examples the length of material purchased is a mixed number.

<table>
<thead>
<tr>
<th>Material A costs R20/m.</th>
<th>Material B costs R60/m.</th>
<th>Material B costs R70/m.</th>
</tr>
</thead>
<tbody>
<tr>
<td>What will 3½m cost?</td>
<td>What will 2¼m cost?</td>
<td>What will 1,2m cost?</td>
</tr>
<tr>
<td>Answer: 3½ × R20</td>
<td>Answer: 2¼ × R60</td>
<td>Answer: 1,2 × R70</td>
</tr>
<tr>
<td>3 × R20 = R60</td>
<td>2 × R60 = R120</td>
<td>1 × R70 = R70</td>
</tr>
<tr>
<td>*½ × R20 = R10</td>
<td>¼ × R60 = R135</td>
<td>¼ × R70 = R14</td>
</tr>
<tr>
<td>3½ × R20 = R70</td>
<td>*¼ of R60</td>
<td>*½ of R70</td>
</tr>
</tbody>
</table>

6. Calculate the cost of: 

<table>
<thead>
<tr>
<th>Material A costs R20/m.</th>
<th>Material B costs R60/m.</th>
<th>Material B costs R70/m.</th>
</tr>
</thead>
<tbody>
<tr>
<td>2½ metres of cotton</td>
<td>1½ metres of denim</td>
<td>3½ metres of satin</td>
</tr>
<tr>
<td>at R40/m.</td>
<td>at R96/m.</td>
<td>at R120/m.</td>
</tr>
<tr>
<td>Answer: R80 + R20 = R100</td>
<td>Answer: R96 + R48 = R144</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3¼ metres of satin</td>
<td>2¾ metres of linen</td>
<td>4,6 metres of material</td>
</tr>
<tr>
<td>at R120/m.</td>
<td>at R100/m.</td>
<td>at R30/m.</td>
</tr>
<tr>
<td>Answer: R360 + R30 = R390</td>
<td>R200 + R75 = R275</td>
<td>R120 + R18 = R138</td>
</tr>
</tbody>
</table>

Question 10  Problem Solving involving Distance (including Fractions)

1. Busi lives 3,2 km from school. Adam lives 5 times as far as Busi from school. How far from the school does Adam live? 3200m × 5 = 16 000 m = 16 km

2. The distance from Junior’s home to school is 3¼ km. If he cycles to school and back home every day, how far does he cycle in 1 week? 6500m × 5 = 32 500m = 32,5km

3. Pravina runs 5½ times around a 400m athletics track. How far does she run? Distance run = 200m + 2000m = 2200m = 2,2km

4. Niel runs 6km on Friday and 2½ times as far on Saturday. How far does he run in total over the two days? Total distance = 6km + 15km = 21km
Question 11 | Speed in km/h

1. Study: Speed tells us the distance that can be travelled in a certain amount of time, usually 1 hour. If 210 km is covered in 2 hours, it means that the speed travelled is 105 km per ONE hour.

This is calculated as follows: \( \frac{210 \text{ km}}{2 \text{ hours}} = 105 \text{ km/h} \)

2. What is the speed, in km/h, of each of the following?
   
   a) \( \frac{220 \text{ km}}{2 \text{ hours}} = 110 \text{ km/h} \)
   
   b) \( \frac{400 \text{ km}}{5 \text{ hours}} = 80 \text{ km/h} \)
   
   c) \( \frac{324 \text{ km}}{2 \text{ hours}} = 162 \text{ km/h} \)
   
   *d) \( \frac{875 \text{ km}}{7 \text{ hours}} = 125 \text{ km/h} \)

3. Dad travels at a speed of 120 km/h. What distance does he cover in:
   
   a) \( 120 \text{ km/h} \times 2 \text{ h} = 240 \text{ km} \)
   
   b) \( 120 \text{ km/h} \times 3 \text{ h} = 360 \text{ km} \)
   
   c) \( 120 \text{ km/h} \times 7 \text{ h} = 840 \text{ km} \)
   
   d) \( 120 \text{ km/h} \times 10 \text{ h} = 1200 \text{ km} \)
   
   e) \( \frac{1}{2} \text{ h} \times 120 \text{ km/h} = 60 \text{ km} \)
   
   *f) \( 2\frac{1}{2} \text{ h} = 2 \times 120 \text{ km/h} + \frac{1}{2} \times 120 \text{ km/h} = 300 \text{ km} \)

4. Mr Smith travels at 100 km/h. What distance does he cover in:
   
   a) \( 30 \text{ min} = \frac{1}{2} \text{ h} \times 100 \text{ km/h} = 50 \text{ km} \)
   
   b) \( 15 \text{ min} = \frac{1}{4} \text{ h} \times 100 \text{ km/h} = 25 \text{ km} \)
   
   c) \( 1\frac{1}{2} \text{ h} = 2 \times 100 \text{ km/h} + \frac{1}{2} \times 100 \text{ km/h} = 150 \text{ km} \)
   
   *d) \( 2 \text{ h} 45 \text{ min} = 2 \frac{3}{4} \text{ h} = 2 \times 100 \text{ km/h} + \frac{3}{4} \times 100 \text{ km/h} = 275 \text{ km} \)

Question 12 | Speed in steps/minute

1. The average walking speed of an adult is 120 steps per minute.
   
   a) How many steps will be walked in 2 min? \( 120 \text{ steps/min} \times 2 \text{ min} = 240 \text{ steps} \)
   
   b) How many steps will be walked in \( \frac{1}{2} \text{ min} \)? \( 120 \text{ steps/min} \times \frac{1}{2} \text{ min} = 60 \text{ steps} \)
   
   c) How many steps will be walked in \( 2\frac{1}{2} \text{ min} \)? \( 240 \text{ steps} + 60 \text{ steps} = 300 \text{ steps} \)
   
   *d) How many steps will be walked in 15 seconds = \( \frac{1}{4} \text{ min} \)? \( 120 \text{ steps/min} \times \frac{1}{4} \text{ min} = 30 \text{ steps} \)
   
   *e) How many steps will be walked in 2 min 45 seconds = \( 2\frac{3}{4} \text{ min} \)? \( 120 \text{ steps/min} \times 2 \text{ min} = 240 \text{ steps} \)
   
   \( 120 \text{ steps/min} \times \frac{3}{4} \text{ min} = 90 \text{ steps} \)
   
   \( 120 \text{ steps/min} \times 2\frac{3}{4} \text{ min} = 330 \text{ steps} \)

2. Margie records that she walks 230 steps in 2 minutes.
   
   a) On average, how many steps does Margie walk per minute? \( \frac{230 \text{ steps}}{2 \text{ min}} = 115 \text{ steps/min} \)
   
   b) How many steps will she walk in 5 min? \( 115 \text{ steps/min} \times 5 \text{ min} = 575 \text{ steps} \)

3. Theo records that he walks 378 steps in 3 minutes.
   
   a) On average, how many steps does he walk per minute? \( \frac{378 \text{ steps}}{3 \text{ min}} = 126 \text{ steps/min} \)
   
   *b) How many steps will he walk in \( 2\frac{1}{2} \text{ min} \)? \( 252 + 63 = 315 \text{ steps} \)
   
   *c) How long will it take him to walk 1260 steps? \( 10 \text{ min} \) because \( 126 \text{ steps/min} \times 10 \text{ min} = 1260 \text{ steps} \)
Assessment 3

1. Circle the correct answer in each.
   1.1. $\frac{17}{20}$ written as a percentage is $\frac{17 \times 5}{20 \times 5} = \frac{85}{100}$
       a) 17%    b) 20°C    c) 85%    d) 87%
   1.2. 20% of R350 = $\frac{1}{5}$ of 350 = R70
       a) R70    b) R35    c) R250    d) None of the options.
   1.3. 150 km = .......... a) 0,15 m    b) 150 000 m    c) 15 000 cm    d) 15,0 km
   1.4. Complete the sequence: 64 ; 16 ; 4 ; ...... ; ...... .
       a) 1 ; 0    b) 1 ; ¼    c) 0 ; ½    d) 2 ; 1
   1.5. Janie receives 20% discount on a skirt marked R250. She pays ...... for the skirt.
       a) R50    b) R300    c) R185,50    d) R200

2. Three distances total 3 km. The first distance is 895m and the second is 1,06 km.
   Calculate the third distance. 3000m – (895m + 1060m) = 3000m – 1955m = 1045m = 1,045km

3. 29% of the balls in a bag are blue, 45% are red, 8% are green and the rest are yellow.
   What percentage of the balls are yellow? 100% – (29% + 45% + 8%) = 100% – 82% = 18%

4. Jabu spent 40% of his R300 on shoes and 25% of the remaining money on airtime.
   How much money does he have left?

5. Complete the table.
   Rule: Input $\rightarrow \frac{x}{4} - 3 \rightarrow$ Output
   and Input $\leftarrow \frac{y}{4} + 3 \leftarrow$ Output

<table>
<thead>
<tr>
<th>Input</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>15</th>
<th>20</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output</td>
<td>1</td>
<td>5</td>
<td>9</td>
<td>13</td>
<td>57</td>
<td>77</td>
</tr>
</tbody>
</table>

6. Determine data set’s mode and median.
   Mode = 18     Median = $\frac{15}{2}$
   $\frac{14 + 17}{2} = \frac{31}{2} = 15\frac{1}{2}$

7.* The pie chart indicates how Carla spends 3 hours of her time. The times given are in minutes.
   a) How much time did she spend resting? $\frac{180 - 170 = 10 \text{ min}}{180 \times 3 = 10 \text{ min}}$
   b) What percentage of her time does she gym? $\frac{45}{180} = \frac{1}{4} = 25\%$
   c)* What fraction (simplest form) of her time does she spend working and driving? $\frac{95}{180} = \frac{19}{36}$

8. Complete each sequence.
   a) 1 ; 1 ; 2 ; 3 ; 5 ; 8 ; 13    b) 2 ; 6 ; 12 ; 20 ; 30 ; 42