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1. PATTERNS AND ALGEBRA

Activity 1

Patterns

1.1 Given

(a) 8; 15; 22....
(b) 1; 8; 27.......
(c) 2; 3; 6; 11; 18....

(d) 1; 2; 4; 8....
(e) \(a + 2b; 2a + 5b; 3a + 8b\) ....

(f) 1; 2; 4; 7; 11; 16....

1.1.1 Write the next three terms

1.1.2 Write down the 10th term

1.1.3 Write down the general rule

1.2

<table>
<thead>
<tr>
<th>Term</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Value</td>
<td>1</td>
<td>5</td>
<td>25</td>
<td>125</td>
<td></td>
</tr>
</tbody>
</table>

1.2.1 Write down the 5th term

1.2.2 Write down the general rule

1.3

\[ y = x + 12 \]

Write down the value of \(x\) and \(y\)

Skill/concepts

- Identify a pattern, generalize
- Input/output, substitution
Activity 2

Algebraic Expressions

2.1 Write an algebraic expression that will symbolize each of the following

2.1.1 The product of five and seven
2.1.2 The sum of the additive inverse of three and the multiplicative inverse of 2
2.1.3 Six more (less) than a certain number
2.1.4 A certain number less than six
2.1.5 A number repeated as a term three times
2.1.6 A certain number times itself.
2.1.7 The product of the square of a number and the cube of the same number

2.2 Write the following algebraic expressions as statements (like the ones in 2.1 above)

2.2.1 $35 - 12$
2.2.2 $\frac{1}{3}(5 + 0.5)$
2.2.3 $7 - y$
2.2.4 $3x - 2y$
2.2.5 $\frac{3x}{2}$
2.2.6 $2^n + 1$
2.2.7 $3^n - 7$
2.2.8 $4(n - 2) + 4$

2.3 Identify the like terms in the following algebraic expressions and then simplify

2.3.1 $3x^2 - 4xy + 5x^2 - 9$
2.3.2 $xyz - 5xy + 6zx + 15xyz - 1$
2.3.3 $x^3 + y^3 - 3xy + 6yx - 4y^3$
2.3.4 $abc - bcd + cda$

2.4 In the expression $16x^3 - 9x^2 + 10x - 1$

2.4.1 How many terms are in the expression?
2.4.2 Write down the coefficient of $x^2$.
2.4.3 What is the value of the constant term.
2.4.4 Calculate the value of the expression when $x = 3$ and when $x = \frac{1}{2}$
2.4.5 Write down the degree of the expression.
2.5 (a) $48x^2y^3 - 12x^2y^3$ (b) $12x^2y^3 + 48x^3y^2$

2.5.1 Simplify the above expression where possible in each case.

2.5.2 Write down the degree of the expression in each case above.

2.6 Simplify:

2.6.1 $2a^3bc^2(3a^2 - 3b + c)$

2.6.2 $(3x - 2)(x - 1)$

2.6.3 $x(x + 4)^2 - 3x^2(x - 3)$

2.6.4 $\frac{18x^5}{9x^4}$

2.6.5 $\frac{8x^5 + 10x^3}{2x}$

2.6.6 $\frac{24x^4 - 12x^3}{6x}$

2.7 Factorise fully:

2.7.1 $5t - 15t^2$

2.7.2 $3x^2 - 27$

2.7.3 $a^2(x - y) - b^2(x - y)$

2.7.4 $3x^3(a - b) + x(b - a)$

2.7.5 $x^2 - 5x - 6$

2.7.6 $3a^2 - 21a + 36$

2.7.7 $ax + bx - 2a - 2b$

2.7.8 $a^4 - b^4$

2.7.9 $9(a + b)^2 - 1$

2.7.10 $27 - 243x^2$

Skills/concepts
- Translation into mathematics symbols
- Translation into word problems
- Recognise like terms
- Understanding the terminology around expressions
- Basic math operations, working with like terms
- Factoring, dividing, difference of 2 squares, trinomials
2. FRACTIONS

Activity 1

Common fractions, decimal fractions and percentages

Complete the following table:

<table>
<thead>
<tr>
<th>Decimal fraction</th>
<th>Percentage</th>
<th>Common fraction</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.6</td>
<td>60</td>
<td>$\frac{3}{5}$</td>
</tr>
<tr>
<td>0.723</td>
<td>(a)</td>
<td>(b)</td>
</tr>
<tr>
<td>(c)</td>
<td>53</td>
<td>(d)</td>
</tr>
<tr>
<td>0.825</td>
<td>(e)</td>
<td>(f)</td>
</tr>
<tr>
<td>0.205</td>
<td>(g)</td>
<td>(h)</td>
</tr>
<tr>
<td>(i)</td>
<td>(j)</td>
<td>$\frac{1}{60}$</td>
</tr>
</tbody>
</table>

Activity 2

Problems on fractions

(a) $\frac{4}{15}$ of soccer team players are injured and not able to play. Of those that are uninjured, $\frac{1}{11}$ is sick and not able to play. What fraction of the players is able to play?

(b) Lwandi got her Maths test back and was very happy about getting 85% for the test. To get the full marks for the test she would need to get 60 marks. How many marks did she lose?

(c) Josh and Jenny are in the same Mathematics class. Josh has completed $\frac{17}{24}$ of his homework and Jenny has $\frac{9}{13}$ of her homework. Who has completed more of the homework?

(d) If one South African rand is valued at 0.125 of one euro, one South African rand will be valued at what fraction to the euro? Can you calculate what one euro will cost in rand?
(e) Nicki has bought 13 bottles of 2-litre soda for her birthday. The cups her friends will be using can take 0.25 litre. How many cups can she fill with the soda that she bought?

Activity 3

The highest common factor (HCF)

[The HCF is sometimes referred to as the greatest common factor (GCF)].

**Definition:** The highest common factor (HCF) of two or more numbers is the largest number which is a factor of both or all. We use HCF when expressing fractions in their simplest form or factorizing expressions.

Find the highest common factor (HCF) for the following sets of numbers:

3.1 6, 9 and 45
3.2 10² and 10³
3.3 \(\sqrt{100}\) and \(\sqrt{144}\)
3.4 \(2abc^3\), \(6b^2cd\) and \(2a^2b^3c^4\)
3.5 \(6xyz\) and \(9xz-12xy^2\)
3.6 \(-4x+2x^2\) and \(-2x^3-2x^2+4x\)
3.7 \(a^2-4a\), \(a^2-16\) and \(a^2-2a^2\)
Activity 4

The lowest common multiple (LCM)

[The LCM is sometimes referred to as the least common multiple (LCM)].

**Definition:** The lowest common multiple (LCM) of two or more numbers is the smallest number which is the multiple of both or all. We use LCM to convert fractions to their equivalents. This assists with expressing fractions as fractions of the same denominator when we are either adding or subtracting them.

4.1 6, 9 and 45
4.2 3, \(2^2\) and \(2^3\)
4.3 \(2abc^3\), \(6b^2cd\) and \(2a^2b^3c^4\)
4.4 \(-4x + 2x^2\) and \(-2x^3 - 2x^2 + 4x\)
4.5 \(a^2 - 4a\), \(a^2 - 16\) and \(a^2 - 2a^2\)

Activity 5

Simplifying fractions:

5.1 Calculate the following fractions:

5.1.1 \(\frac{8^2}{8^3} - \frac{10^2}{10^3}\)  
5.1.2 \(\frac{1^2}{1^3} - \frac{1}{3} + \frac{\sqrt{4}}{\sqrt{9}}\)  
5.1.3 \(\frac{8 \times 4}{3 + 5} + \frac{6}{5}\)

5.1.4 \(\left(\frac{2}{3}\right)^3 - \frac{1}{3} + \frac{\sqrt{4}}{\sqrt{9}}\)  
5.1.5 \(\frac{\sqrt{25}}{\sqrt{100}} + \frac{\sqrt{1331}}{\sqrt{144}}\)

5.2 Simplify the following fractions

5.2.1 \(\frac{60}{120}\)  
5.2.2 \(\frac{55}{155}\)  
5.2.3 \(\frac{-10ab^2}{15a^2b}\)

5.2.4 \(\frac{7abc^2}{14a^24b}\)  
5.2.5 \(\frac{4x^2}{x^\infty}\)  
5.2.6 \(\frac{-4a^2x9bx^2}{6abx - 15x^4}\)
5.2.7 \[ \frac{48a^2b^336a^2b^2}{27ab^232a^5b^4} \]

5.3 Simplify the following

5.3.1 \[ \frac{2a^2}{4a} \]  
5.3.2 \[ \frac{9xz - 12xy^2}{6xyz^2} \]  
5.3.3 \[ \frac{5a^2b - 5ab^2}{5ab - 5b^2} \]

5.3.4 \[ \frac{-2x^4 + 54x}{3x^2 - 9x} \]  
5.3.5 \[ \frac{-2x^3 - 2x^2 + 4x}{-4x + 2x^2} \]

5.4 Simplify

5.4.1 \[ \frac{5a + 2a}{18 + 9} \]  
5.4.2 \[ \frac{2a + a + b}{3 + 4 - 2} \]  
5.4.3 \[ \frac{3 - 1 + 2}{5a - 6a + 2} \]

5.4.4 \[ \frac{3 - 3 + 2}{2a + 5a} \]  
5.4.5 \[ \frac{x - 1}{3x^2 + x + 3} \]

5.4.6 \[ \frac{4 + x^2}{6x^2} \]

5.4.7 \[ \frac{a + b}{a - b} - \frac{a - b}{a + b} \]

5.5 Simplify:

5.5.1 \[ \frac{a^2 - 4a}{a^2 - 16} \]

5.5.2 \[ \frac{a^2 - 2a^2}{2a^2 + 8a} \]  
5.5.3 \[ \frac{x^2 - y^2}{x^2 - y^2} \]

5.5.4 \[ \left(1 + \frac{1}{\sqrt{x}}\right) \left(1 - \frac{1}{\sqrt{x}}\right) = 1 \]
3. EQUATIONS

Activity 1

Set up algebraic equations and solve them.

1.1 Khethiwe is on page 84 of her book. The book has 250 pages. How many pages does she still have to read?

1.2 Solomon buys x amount of toffees. He has 8 left from yesterday. If today he eats half of all the toffees he bought, he will have 3 left for tomorrow. How many did he buy?

1.3 The sum of six times a certain number and seven is 19

1.4 The length of a rectangle is four cm more than its width. If its perimeter is 20 cm, determine the width.

1.5 A father is three times as old as his son. In ten years’ time their combined ages will be 68. How old are they now?

1.6 In a given amount of time, Mr Nxumalo drove twice as far as Mrs Mlambo. Altogether they drove 180 km. Determine the number of km driven by each.

1.7 Determine two numbers such that the sum of three times the first and twice the second is 40. The first number, increase by two then multiplied by five is also 40.

Skills/concepts
- Writing word statements using symbols
- Solving real life problems

Activity 2

Solve equations

2.1 Solve the equations by inspection

2.1.1 \( x + 10 = 12 \) \hspace{2cm} 2.1.2 \( x^2 = 16 \)

2.1.3 \( 14 - b = 9 \) \hspace{2cm} 2.1.4 \( 3x + 1 = 13 \)

2.1.5 \( \frac{p}{10} = 4 \) \hspace{2cm} 2.1.6 \( x^3 = 8^2 \)
2.1.7 \( x^3 = \frac{72}{9} \)

2.1.9 \( \frac{x}{3} + 2 = 7 \)

2.1.8 \( \frac{10x}{4} + 1 = 6 \)

2.1.10 \( \frac{2x}{3} + 7 = 3 \)

2.2 Solve:

2.2.1 \( 5 - 3x = 20 \)

2.2.2 \(-5 - 3x = -20 \)

2.2.3 \( 2x - 5 = 5x + 16 \)

2.2.4 \((x - 3)(x + 4) = 0 \)

2.2.5 \( \frac{x - 2}{4} + \frac{2x + 1}{3} = \frac{5}{3} \)

2.2.6 \( x - \frac{x - 1}{2} = 3 \)

2.2.7 \( \frac{2}{x} + 3 = \frac{5}{x} - 1 \)

2.2.8 \( \frac{2}{x} + 3 = \frac{5}{2x} - 1 \)

2.2.9 \( x^2 - 1 = 0 \)

2.2.10 \( 3^{x+1} = 81 \)

2.2.11 \( x^3 = -27 \)

2.2.12 \( 2^x = \frac{1}{32} \)

2.3 State in each case how many solutions do each of the following have

2.3.1 \( \frac{x}{3} + 2 = x - 1 \)

2.3.2 \( 2x + 1 = \frac{x}{4} - 3 \)

2.3.3 \( 3x + 2 = 4x + 3 - x \)

2.3.4 \( 2x + 3 = 5x + 4 - 3x \)

2.3.5 \( 2(x + 5) = x + 7 + x + 3 \)

2.3.6 \( \frac{x}{3} + 1 = 1 - \frac{2x}{3} + x \)

\( 0 = 0 \quad \text{Inf M S} \quad 4 = 3 \quad \text{Ns} \quad x = \text{no one} \)

Skills/concepts

- Solving equations by inspection
- Solving equations using algebraic techniques
4. GRAPHS

Activity 1

1.1 Name the point that has the coordinates.

(a) (2; 2)  
(b) (-6; 2)  
(c) (1; -4)  
(d) (0; -6)  
(e) (-4; -2)

1.2 Write the coordinates of each point.

(a) B  
(b) G  
(c) E  
(d) N  
(e) H

1.3 In what quadrant is each point located?

(a) C  
(b) J  
(c) L  
(d) M  
(e) K
1.4 Plot each set of points on a different plane and join them in order to form a quadrilateral. Identify the quadrilateral. Use coordinate planes at the end of this activity.

(a) A(1; 1), B(1; 5), C(3; 5), D(3; 1)  
(b) J(1; 3), K(5; 1), L(8; 1), M(4; 3)  
(c) P(3; 0), Q(6; 2), R(5; 2), S(2; 0)  
(d) W(1; 1), X(0; 3), Y(4; 1), Z(3; 1)  

1.5 In which quadrant would the following points be found:

(a) (1, 1)  
(b) (1, 2)  
(c) (2, 1)  
(d) (-1, 2)  
(e) (439, -890)  
(f) (-1, -1)
Activity 2

2.1 Sketch the graphs of following equations

2.1.1 \( y = x \)  
2.1.2 \( x = -4 \)

2.1.3 \( y = 3 \)  
2.1.4 \( y = -3x + 4 \)

2.1.5 \( y = \frac{-2}{3}x - 1 \)  
2.1.6 \( x - y = 3 \)

2.1.7 Passing through \((0;4)\) and \((-4;0)\)  
2.1.8 Passing through \((2;-1)\) and \((4;5)\)

2.1.9 Passing through \((2;1)\) and parallel to the y-axis

2.2 Study the straight line graphs below and answer the questions that follow.

2.2.1 State whether graph \(f\) is linear or non linear

2.2.2 Describe each graph as constant, increasing or decreasing

2.2.3 Determine the \(y\) intercept of graph \(g\)

2.2.4 Write down the \(x\) intercepts of graphs \(f\) and \(h\)
2.2.5 What is the gradient of graph $h$  

2.2.6 Calculate the gradient of the graph $f$ and determine the equation of the graph

Skills/concepts
- Graph sketching
- Intercepts, and gradients
- Interpretation of graphs

Activity 3
For enrichment purpose

There are five different ways to interpret or represent a function:

- Through a context (i.e. Contextualisation)
- Through a Language (i.e. Verbalisation)
- Through a table of values (i.e. Tabulation)
- Through an equation (i.e. Formalisation)
- By means of a graph (i.e. Graphing)

Represent the following statements in 5 different forms

3.1 A vendor sells steak rolls at a taxi rank. She has to pay the local authority R35 a day to use a table at the rank. She sells the steak rolls for R8 each and has calculated that the cost of the roll, meat, and sauce is about R5.50 so that she makes a profit of R2.50 on the number of rolls she sells.

3.2 Gary and Wayne are running equally fast around a track. After Gary has run 6 laps, Wayne has 9 laps. They keep on running until Gary has run 15 laps.

3.3 Travellers wish to exchange their rand currency for Euros. The exchange rate is R12.20 for one Euro.

3.4 A car loses 20% of its value every year. I wonder how much it will be worth in a few years’ time? What if I keep it for 10 years?

3.5 When I fold a piece of paper in half I see that I have two sections. I wonder how many sections I will have if I fold it twice and then carry on folding?
5. CONGRUENCY AND SIMILARITY

Activity 1

3.1 Measure and label all the angles and the sides of the given triangles below,

3.2 What are the findings with respect to both angles and sides?
3.3 Comment on the relationship between the two triangles

Activity 2

5.1 Construct the following triangles:
   1.1.1 \( \Delta ABC \) with \( AB = 4\text{cm}; \ BC = 5\text{cm} \) and measure \( AC \)
   1.1.2 \( \Delta XYZ \) with \( XY = 4\text{cm}; \ XZ = 6.5\text{cm} \) and measure \( YZ \)
5.2 Compare and comment on the relationship between \( \Delta ABC \) and \( \Delta XYZ \) you have just constructed.

Activity 3

4.1 Construct \( \Delta ZTE \) with \( ZS = 5\text{cm}, \ ZE = 5\text{cm} \) and \( TE = 6\text{cm} \).
4.2 Construct \( \Delta GSB \) with \( GS = 5\text{cm}; \ GB = 5\text{cm} \) and \( SB = 6\).
4.3 Compare and comment on the relationship between \( \Delta ZTE \) and \( \Delta GSB \) you have just constructed.
Activity 4

4.1 Construct $\triangle JKL$ and $\triangle TUV$, both with dimensions 6cm; 10cm and 60 degrees.

4.2 How is $\triangle JKL$ related to $\triangle TUV$? Provide all details

Activity 5

5.1 Measure and compare the two triangles with respect to sides and angles.

5.2 What conclusion can you make with regards to the relationship of the two triangles?

Activity 6

6.1 Construct the following triangles:

   6.1.1 $\triangle ABC$ with $\angle ABC = 90^\circ$ and $\angle ACB = 60^\circ$
   
   6.1.2 $\triangle XYZ$ with $\angle XYZ = 90^\circ$ and $\angle XZY = 60^\circ$

6.2 Compare and comment on the relationship between $\triangle ABC$ and $\triangle XYZ$ you have just constructed.

Activity 7

7.1 Draw $\triangle BMW$ and $\triangle GTI$ with the following dimensions, 6cm; 8cm; 10cm and 3cm; 4cm; 5cm respectively.

7.2 Compare and comment on $\triangle BMW$ and $\triangle GTI$. 
Activity 8

8.1 \( \triangle ABC \sim \triangle EDC \)

8.1.1 Calculate the length of BC.

8.1.2 Calculate the length of CE.

8.2 Are the two triangles similar? Support your answer.
8.3 \( \triangle XYZ \cong \triangle RST \). Calculate the length of ST.

![Diagram of \( \triangle XYZ \) and \( \triangle RST \)]

8.4 Complete and simplify where possible.

![Diagram of \( \triangle KLM \) and \( \triangle DEF \)]

8.4.1 \( \frac{KM}{DF} = \square \)

8.4.2 \( \frac{?}{DE} = \square \)

8.4.3 \( \frac{?}{\Delta} = \frac{10}{20} = \frac{1}{2} \)

8.4.4 Are the two triangles similar, why?
Activity 9

Are the following pairs of triangles congruent? If they are, state the postulate / axiom that makes them congruent.

9.1

9.2

9.3 Given that T is the midpoint of WR.

9.4 Given that IH bisects WH.

9.5 Given that LGEU is a rectangle.

9.6 Given that JK = ML and JKM = LMK

9.7
6. AREA AND PERIMETER

Activity 1

1. In your own words, explain the meaning of “perimeter” of the figure.

2. Do you think that perimeter is best described as a measurement of distance, coverage or space?

3. Give an example of a unit of measurement for perimeter.

4. Imagine living at a time tape measures did not exist. How would you determine and then communicate the perimeter of the following chequered shape to a friend, who cannot see the shape.

5. Find the value of \( P \).

5.1

\[
\begin{align*}
\text{Perimeter} &= 24 \\
8 \\
\text{P} &
\end{align*}
\]

5.2

\[
\begin{align*}
\text{Perimeter} &= 20 \\
2 \\
\text{P} &
\end{align*}
\]
Activity 2

1. In your own words, explain the meaning of “area” of the figure.

2. Do you think that area is best described as a measurement of distance, coverage or space?

3. Give an example of a unit of measurement for area.

4. Imagine living at a time tape measures did not exist. How would you determine and then communicate the area of the shape below to a friend, who cannot see the shape.

5. Find the area
   5.1

   ![Triangle with base 3 km and height 4 km]

   5.2

   ![Circle with radius 1.5 units]
Activity 3

Important:

- When dealing with triangles make sure that learners understand that the height must be the perpendicular height from the corresponding base.
- Remind learners about the differences between the area and perimeter.

3.1 Determine the perimeter of each of the following figures. (Assume that the distance between each pair of the gridlines is 1cm)

![Figure 1](image1.png)
![Figure 2](image2.png)

3.2 Solve the following perimeter and area problems;

3.2.1 The area of a square is $64m^2$

3.2.1.1 Find its side

3.2.1.2 Find the perimeter

3.2.2 The area of the soccer field is $5000m^2$ and it is 50m wide.

3.2.2.1 Find the length of the field.

3.2.2.2 Find the perimeter of the field.

3.2.3 Ayanda has a triangular shaped piece of material which has an area of $35m^2$. She cuts out a rectangle with a width of 3cm and a length of 5cm. What will the area of the remaining piece of material be?
3.3 Find the area and perimeter of the following shapes

3.3.1

3.3.2

3.3.3
3.4 Find the area and circumference. Answers correct to 2 decimal places.

3.4.1

![Circle with radius 5.5 cm]

3.4.2 Find

3.4.2.1 The area of a circle with a radius of 50m.
3.4.2.2 Area of a circle with a diameter of 7cm.
3.4.2.3 The radius of a circle with an area of $314 \text{ mm}^2$.
3.4.2.4 The area of a semi-circle with a diameter of 12m.
3.4.2.5 The total area of this shape, given the diameter of the circle as 7cm and the length of the rectangle as 18cm.

![Semi-circle and rectangle]

3.5 Convert the following units to the units indicated.

3.5.1 1.5 cm to ………………………… mm
3.5.2 75 mm to ………………………… cm
3.5.3 10 250 m to …………………… km
3.5.4 4.75 km to ……………………… m
3.5.5 356 $m^2$ to ……………………… $mm^2$
3.5.6 0.0001 $km^2$ to …………………… $mm^2$
3.5.7 1.55 $cm^2$ to …………………… $m^2$

3.6 For this exercise you will need a piece of string that is approximately 50cm long, 4 pins a ruler, a calculator and a wooden board or polystyrene.

3.6.1 Make 3 different shapes mentioned in the table. The same string of length 36cm must be used for each shape so they all have the same perimeter. Your pins can be used in corners to hold the shape. Calculate the area and record it in a table, similar to the one below.
What do you notice?

3.6.2 Now we look at the relationship between the perimeter and area when the perimeter is doubled. Record your results in the table below.

<table>
<thead>
<tr>
<th>Shape</th>
<th>Perimeter</th>
<th>Area</th>
<th>Double perimeter</th>
<th>area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Square</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rectangle</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Triangle</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

What do you notice?

**Activity 4**
In the following diagrams, the distance between two gridlines is 1cm. Without using a ruler, determine, as accurately as possible, the perimeter and area of each of the given plane figures.

4.1

<p>| | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
</table>

Given a square:

Perimeter =........................
   =....................cm

Area =..................
   =..................cm$^2$

4.2

<p>| | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
</table>

Given a rectangle:

Perimeter =........................
   =....................cm

Area =..................
   =..................cm$^2$
4.3

Draw a right angled triangle using the information below:
Perimeter = 3 + 4 + 5 = 12cm
Area \( \frac{1}{2} \times 3 \times 4 \)
= 6cm²

4.4

Draw a kite using the information below:
Perimeter = 2 × (5 + 1) = 12cm
Area = 4cm² – 3 × 4cm²
= 4cm²

4.5 If the areas of rectangles A, B and C below are 12 cm², 21 cm² and 20 cm² respectively, find the area of rectangle D.

<table>
<thead>
<tr>
<th>A</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>D</td>
</tr>
</tbody>
</table>
4.6 Find the lengths of the diagonals of the following quadrilaterals;

(a) a rectangle with dimensions 10 cm and 8 cm
(b) a square with side 10 cm
(c) this kite . . .

4.7 Pallets of cement are transported in a truck-trailer to a construction site.

A forklift is used to load the cement pallets onto the truck trailer as shown in the diagram above. The cement pallets are placed 3 meters from the truck trailer (B to C) on the floor as shown in the diagram below. Point A is 3.4 meters from the floor (C) on which the pallets are placed before they were picked up by the forklift. Calculate the height to which the cement pallet on the forklift should be elevated before it is loaded on the truck trailer.

4.8 Find the area of each of the following triangles:

(a)  
(b)  
(c)
For more activities see Grade 9 workbook 1, pages 42 to 43.

Activity 5

5.1 Calculate the surface area of these objects

5.1.1

5.1.2

Activity 6

6.1 Copy and complete the table below.

<table>
<thead>
<tr>
<th>Cube</th>
<th>Side of cube</th>
<th>Surface area</th>
<th>Volume</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>20</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

6.1.1 How does the side of cube B compare to the side of cube A?
6.1.2 How does the side of cube C compare to the side of cube B?
6.1.3 How does the surface area of cube B compare to the surface area of cube A?
6.1.4 How does the surface area of cube C compare to the surface area of cube B?

6.1.5 How does the volume of cube B compare to the volume of cube A?

6.1.6 How does the volume of cube C compare to the volume of cube B?

6.1.7 From the above, what do you conclude?

6.2 Shape B is twice the size of shape A. Compare the volume of the rectangular prisms.

6.2.1 **Doubling** the **height** results in

6.2.2 What will happen if we **double** the **length**?

6.2.3 What will happen if we **double** the **length** and the **breadth**?

6.2.4 What will happen if we **double** the **length**, **breadth** and **height**?
6.2.5 The radius of cylinder B is **double** the **radius** of cylinder A. Compare the volume of the cylinders.

\[ r = 3 \quad \text{ and } \quad r = 6 \]

**Doubling** the **radius** will result in the volume being .................. as large.

6.2.6 What will happen in 6.2.5 if you **double** the **height**?
For more activities see Grade 9 workbook 1, pages 44 to 47.
# ANNEXURE 1

## PROPOSED 5-DAY PROGRAMMES FOR MATHEMATICS

### GRADE 8/9 PROGRAMME

<table>
<thead>
<tr>
<th>DAY</th>
<th>TIME</th>
<th>ACTIVITY / TOPIC</th>
<th>FACILITATOR</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>09H00 – 12H00</td>
<td>Patterns and Graphs – concepts and skills, teaching method, links to other topics</td>
<td></td>
</tr>
<tr>
<td></td>
<td>12H00 – 12H30</td>
<td>LUNCH</td>
<td></td>
</tr>
<tr>
<td></td>
<td>12H30 – 15H00</td>
<td>Linking worksheet activities to CAPS, ATP and workbooks</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>09H00 – 12H00</td>
<td>Algebra – concepts and skills, teaching method, links to other topics</td>
<td></td>
</tr>
<tr>
<td></td>
<td>12H00 – 12H30</td>
<td>LUNCH</td>
<td></td>
</tr>
<tr>
<td></td>
<td>12H30 – 15H00</td>
<td>Linking worksheet activities to CAPS, ATP and workbooks</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>09H00 – 12H00</td>
<td>Algebra – concepts and skills, teaching method, links to other topics</td>
<td></td>
</tr>
<tr>
<td></td>
<td>12H00 – 12H30</td>
<td>LUNCH</td>
<td></td>
</tr>
<tr>
<td></td>
<td>12H30 – 15H00</td>
<td>Linking worksheet activities to CAPS, ATP and workbooks</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>09H00 – 12H00</td>
<td>Congruency – concepts and skills, teaching method, links to other topics</td>
<td></td>
</tr>
<tr>
<td></td>
<td>12H00 – 12H30</td>
<td>LUNCH</td>
<td></td>
</tr>
<tr>
<td></td>
<td>12H30 – 15H00</td>
<td>Linking worksheet activities to CAPS, ATP and workbooks</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>09H00 – 11H30</td>
<td>Perimeter, Area, Volume – concepts and skills, teaching method, links to other topics</td>
<td></td>
</tr>
<tr>
<td></td>
<td>12H00 – 13H00</td>
<td>Linking worksheet activities to CAPS, ATP and workbooks</td>
<td></td>
</tr>
<tr>
<td></td>
<td>13H00</td>
<td>LUNCH</td>
<td></td>
</tr>
</tbody>
</table>