futurefundi

NCV2 **Mathematics**

Questions

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Question papers Maths L2

Introduction to Paper 1 and Paper 2

Proposed mark distribution between Paper 1 and Paper 2 for external examination papers

Paper 1	
Topics	**Marks**
1. Numbers	30
2. Functions and Algebra	
2.1 Functions	25
2.2 Algebra	25
5. Financial Mathematics	20
Total	**100**

Paper 2	
Topics	**Marks**
3. Space, Shape and Measurement	
3.1 Geometry	30
3.2 Trigonometry	30
4. Data Handling	40
Total	**100**

Formula sheets

- Paper 1
- Paper 2
- Chapter 1: Numbers (Paper 1)

Chapter 1: **Numbers**

QUESTION 1: Converting numbers

1.1 Convert the following decimals to the form $\frac{a}{b}$, where $a, b \in Z$ and $b \neq 0$. Express each answer in its simplest form.

1.1.1 1,16 (1)

1.1.2 $0,3\dot{7}$ (2)

1.2 Convert the following decimals to the form $\frac{a}{b}$, where $a, b \in Z$ and $b \neq 0$. Express each answer in its simplest form.

1.2.1 0,032 (2)

1.2.2 $32.\dot{4}3\dot{5}$ (3)

1.3 Convert the following decimals to the form $\frac{a}{b}$, where $a, b \in Z$ and $b \neq 0$. Express each answer in its simplest form.

1.3.1 0,58 (1)

1.3.2 $0,\dot{4}8\dot{6}$ (2)

1.4 Convert each of the following decimal fractions to the form $\frac{a}{b}$, where $a, b \in Z$ and $b \neq 0$. Express the answer in its simplest form.

1.4.1 0,14 (1)

1.4.2 $4,2\dot{3}$ (3)

1.5 Various options are given as possible answers to the following question. Choose the answer and write only the letter (A–D).

$\sqrt{2}$:

A Non-real irrational number

B Rational integer number

C Real irrational number

D Number that can be written in the form $\frac{a}{b}$, where $a, b \in Z$ and $b \neq 0$. (1)

1.6 Convert the following decimal to the form $\frac{a}{b}$, where $a, b \in Z$ and $b \neq 0$ (simplify to the simplest form):

$0,\dot{4}53<.>$ (5)

1.7 Various options are given as possible answers to the following question.
Choose the answer and write only the letter (A–D).

$\sqrt{17}$ is ...

A an integer

B a natural number

C real and rational number

D an irrational and real number. (1)

1.8 Convert the following decimal to the form $\frac{a}{b}$, where $a, b \in Z$ and $b \neq 0$.

Give the answer as a mixed number.

4,413413 ... (3)

QUESTION 2: Laws of exponents

2.1 Simplify the following by using the laws of exponents. (Leave final answers with positive exponents and in surd form where applicable.)

2.1.1 $\dfrac{(-8x^2y)^2 \times (4xy^3)^2 \times (xy)}{(2xy^2)^2 \times (2xy)^3}$ (4)

2.1.2 $\left(\dfrac{6a^5b^4}{12a^3b^{-2}}\right)^{-\frac{1}{3}}$ (3)

2.2 Simplify the following by using the laws of exponents. (Leave the final answer with positive exponents and in surd form where applicable.)

2.2.1 $\dfrac{\sqrt{16p^4} \times (p^4q^4)^0}{(2p)^2}$ (3)

2.2.2 $\dfrac{(p^2q^2)^{2r} \times (pq^3)^{3r}}{(p^3q^3)^{2r}}$ (3)

2.3 Simplify the following by using the laws of exponents. (Leave your answer with positive exponents and in surd form where applicable.)

2.3.1 $\dfrac{27r^{-3}s^{-2}}{3^{-}(^{-2}r^2 \times 3s^{-3}}$ (3)

2.3.2 $5s^2(r^0s^0)^8 \times 3 \times \sqrt[3]{\dfrac{8^{10} + 4^9}{8^4 + 4^{11}}}$ (4)

2.4 Simplify each of the following by using the laws of exponents. (Leave the answer with positive exponents and in surd form where applicable.)

2.4.1 $2^{1-n} \cdot 2^{n+2} \cdot 2^0$ (2)

2.4.2 $\left(4 \cdot \sqrt[3]{x^{15}y^{30}}\right) \times \dfrac{x^5y^3}{2x^2y^6}$ (3)

2.5 Various options are given as possible answers to the following questions. Choose the answer and write only the letter (A–D).

2.5.1 The factors for $a^2 - 4h^2$:

A $a(a - 4h^2)$

B $(a - 2h)(a + 2h)$

C $(a - 2h)(a - 2h)$

D $(a - 4h)(a + 4h)$ (2)

2.5.2 $2x^5$ in surd form:

A $2\sqrt[5]{x^3}$

B $(2x^5)^{-3}$

C $\dfrac{1}{\sqrt[5]{2x^3}}$

D $\dfrac{2}{\sqrt[5]{x^3}}$ (2)

2.5.3 $9^{-1}x^5 \times 9^2x^{-3}$ in simplified form:

A 9^3x^8

B 9^0x^2

C $-162x^{-2}$

D $9x^2$ (2)

2.6 Simplify the following by using the law of exponents. (Leave final answers with positive exponents and in surd form where applicable.)

2.6.1 $2x^2y^3 \times 3x^5y^{-4}$ (2)

2.6.2 $\dfrac{(-2x^{-2}y^0z^{-1})^2 \times (x^0y)}{(xy^{-4}z^3)^{-1}}$ (3)

2.6.3 $\dfrac{18x \times 8x^{-2}}{9x^{+1} \times 4^2x^{-3}}$ (3)

2.7 Various options are given as possible answers to the following questions. Choose the answer and write only the letter (A–D).

2.7.1 $\dfrac{2^3a^{-5}}{(-3)^2b^2}$ simplified and in exponential form, with a positive exponent, is ...

A $\dfrac{8}{-9a^5b^2}$

B $\dfrac{8}{9a^5b^2}$

C $\dfrac{6a^5}{-6b^2}$

D $\dfrac{6a^5}{9b^2}$ (2)

2.7.2 $-\dfrac{2}{3}x^{\frac{-2}{3}}$ expressed in surd form, with a positive exponent, is equal to ...

A $\dfrac{2}{3}x^{\frac{2}{3}}$

B $\dfrac{2}{3\sqrt[3]{x^2}}$

C $-\dfrac{2}{3}x^3$

D $-\dfrac{3}{2x^{\frac{2}{3}}}$ (2)

2.8 Simplify the following by using the laws of exponents. (Leave final answers with positive exponents and in surd form where applicable.)

2.8.1 $\dfrac{3xy^{-2} \times x^0}{x^{-4}}$ (2)

2.8.2 $\dfrac{x^2y^3 \times x^3y^4}{(2x^{-3}y)^2} \div \dfrac{x^5y^7}{\sqrt{4x^2y^3}}$ (3)

2.8.3 $\left(\dfrac{x^6 + x^6 + x^6}{-x^4 \times x^2}\right)$ (3)

2.9 Simplify the following by using the laws of exponents. (Leave final answers with positive exponents and in surd form where applicable.)

2.9.1 $2x^2y^3 \times 3x^5y^{-4}$ (2)

2.9.2 $\dfrac{(-2x^{-2}y^0z^{-1})^2 \times (x^0y)}{(xy^{-4}z^3)^{-1}}$ (3)

2.9.3 $\dfrac{2^x + 2^{x+2}}{2^x.5^{-1}}$ (3)

QUESTION 3: Surds

3.1 Simplify the following by using surd laws.

3.1.1 $\dfrac{\sqrt{27}+\sqrt{48}+\sqrt{75}}{\sqrt{3}\times\sqrt{9}}$ (3)

3.1.2 $\dfrac{\sqrt{24}+2\sqrt{6}+\sqrt{54}+\sqrt{150}}{\sqrt{96}-\sqrt{6}}$ (3)

3.2 Simplify the following expression by rationalising the denominator.

$\dfrac{\sqrt{3}-1}{1+\sqrt{3}}$ (3)

3.3 Simplify the following using surd laws.

$\dfrac{-\sqrt{125}+6\sqrt{80}+\sqrt{0}}{21\sqrt{5}}$ (4)

3.4 Simplify the following expression by rationalising the denominator.

$\dfrac{7}{1-\sqrt{8}}$ (4)

3.5 Simplify the following using surd laws. Show ALL working.

$\dfrac{\sqrt{125}+\sqrt{45}-\sqrt{20}}{2\sqrt{80}}$ (3)

3.6 Simplify the following expression by rationalising the denominator:

$\dfrac{\sqrt{36a^2}}{\sqrt{5}-\sqrt{6}}$ (4)

3.7 Simplify the following using surd laws. Show all calculations.

$\dfrac{2\sqrt{24}-2\sqrt{6}+\sqrt{54}}{\sqrt{96}+\sqrt{6}}$ (3)

3.8 Simplify the following by using the rules of surds and give the answer with a rational denominator. Show ALL steps.

$\dfrac{6x^4\sqrt{2x^8}-2\sqrt{8x^{16}}}{\sqrt{10x^{16}}}$ (5)

3.9 Simplify the following expression by rationalising the denominator. Show ALL steps.

$\dfrac{\sqrt{6}}{\sqrt{6}-\sqrt{5}}$ (3)

3.10 Apply surd rules to simplify the following without the use of a calculator and give the answer with a rational denominator. Show ALL steps.

3.10.1 $\dfrac{\sqrt{10}-\sqrt{5}}{\sqrt{10}}$ (2)

3.10.2 $\dfrac{\sqrt{48x}-\sqrt{27x}}{\sqrt{48x}}$ (3)

QUESTION 4: Manipulation and substitution

4.1 The equation for the period of oscillation (T) of a simple pendulum is given by a technical formula: $T = 2\pi \left[\frac{l}{g}\right]^{\frac{1}{2}}$ with l as the length of this pendulum and g as the gravitational acceleration.

4.1.1 Show that $l = \frac{gT^2}{4\pi^2}$ (3)

4.1.2 If T = 4 seconds and g = 9,8 m/s^2, determine the approximate value of l correctly to the nearest metre. (2)

4.2 Given: $S = \frac{r}{2}(a + b)$

4.2.1 For the given equation, make b the subject of the formula. (3)

4.2.2 Calculate the value of b if S = 10, a = 2 and r = 12. (2)

4.3 Given: $Z = \frac{2pq}{r + 2}$

4.3.1 For the given equation, make q the subject of the formula. (2)

4.3.2 Find the value of q if Z = 20, p = 10 and r = 4. (2)

4.4 Given: $T = \frac{pr^2}{q}$

4.4.1 Manipulate the given formula and make r the subject of the formula. (3)

4.4.2 Find the value of r if p = 12, T = 20 and q = 14. (2)

4.5 Given: $A_T = A_O + A_O \times \frac{r \times t}{100}$

4.5.1 Make A_O the subject of the formula. (2)

4.5.2 If r = 5, A_T = 3 000 and t = 4, calculate A_O. (2)

QUESTION 5: Arithmetic sequences and series

5.1 Calculate the sum of the first 14 terms of the arithmetic sequence: 3, 7, 11, ... (3)

5.2 Calculate the 13th term of an arithmetic sequence if the first term is 5 and the constant difference is 3. (4)

5.3 Calculate the first term and the 12th term of an arithmetic sequence if the 6th term is 38 and the constant difference is 3. (6)

5.4 The sum of the first 16 terms of an arithmetic progression is 166. The common difference is 3.

Calculate the first term of the sequence. (4)

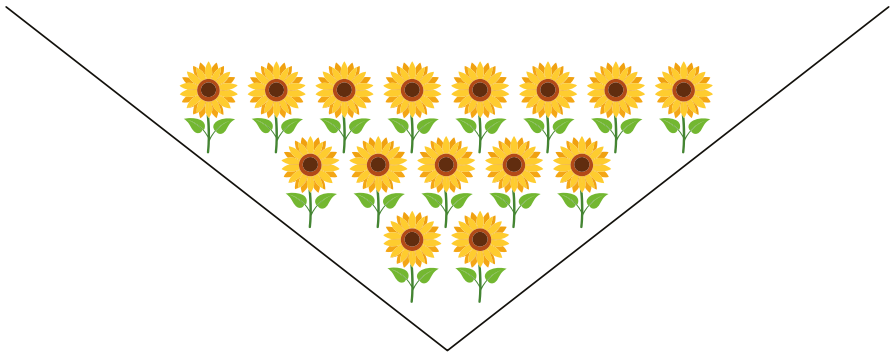
5.5 Given the sequence: 7; 4; 1; ...; –26

5.5.1 Write down the fourth term of the sequence. (1)

5.5.2 Make use of the relevant formula to determine the number of terms in the arithmetic sequence. (4)

5.6 The sum of the first 52 terms of an arithmetic sequence is 8 788. Calculate the constant difference if the first term is 16. (4)

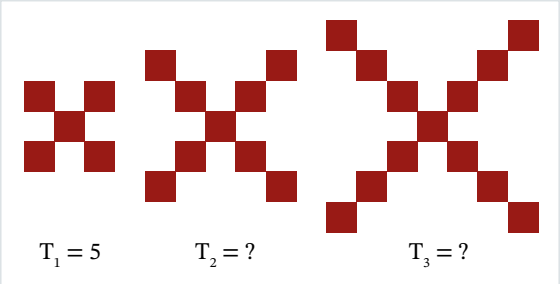
5.7 A sunflower field is planted in a triangle. The first three rows of the field are shown in the diagram below, where the first row contains 2 sunflowers, the second row contains 5 sunflowers, and the third row contains 8 sunflowers.



5.7.1 If the consecutive rows of the field continue increasing in the same pattern, how many sunflowers will there be in the 10th row? (3)

5.7.2 If the field has 25 rows, how many sunflowers will there be in the field? (3)

5.8 The sequence below is made by adding blocks to form a pattern. The first three patterns are given. The first shape comprises five blocks.



5.8.1 How many blocks are required to build the fourth pattern? (1)

5.8.2 One pattern in the sequence is described as $T_n = 161$.

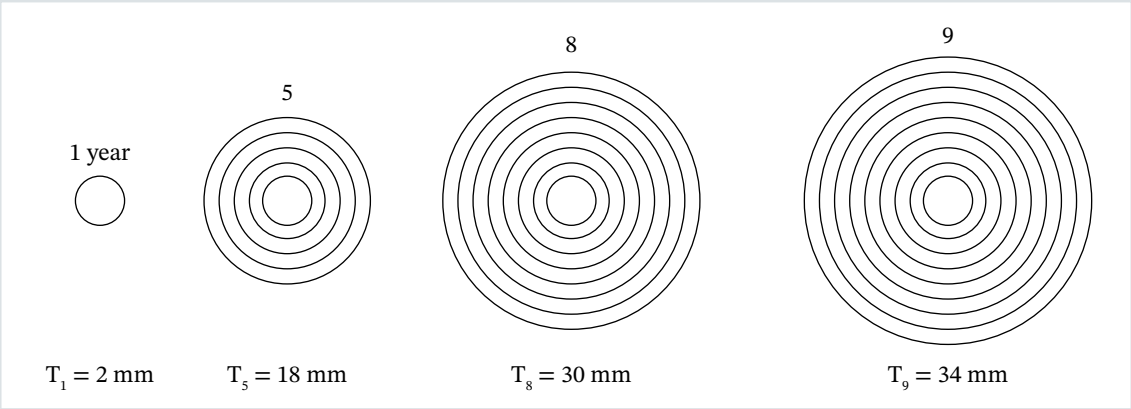
Determine the value of *n*. (3)

5.8.3 Determine S_{12}, which is the sum of the blocks in the first 12 patterns of the sequence. (2)

5.9 The figure below represents the diameter of yellowwood trees over a given number of years. The diameter of a 1-year-old tree is 2 mm, a 5-year-old tree is 18 mm, an 8-year-old tree is 30 mm and a 9-year-old tree is 34 mm.

Hence $T_1 = 2$ mm, $T_5 = 18$ mm, $T_8 = 30$ mm and $T_9 = 34$ mm.

Diameter of a yellowwood tree over several years



5.9.1 Complete the sequence 2; ...; ...; ...; 18; 22; ... 30; 34 (2)

5.9.2 Calculate T_{50} in the sequence, which will give you the diameter of a tree after 50 years. (2)

5.9.3 If the growing pattern continues, what is the age (*n*) of the biggest yellowwood tree, if the tree has a diameter of 2 862 mm? Determine the answer by calculating the value of *n*. (3)

Question papers Maths L2

Introduction to Paper 1 and Paper 2

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Paper 1	
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Total	**100**

Paper 2	
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Total	**100**

Formula sheets

- Paper 1
- Paper 2
- Chapter 2: Functions and Algebra (Paper 1)

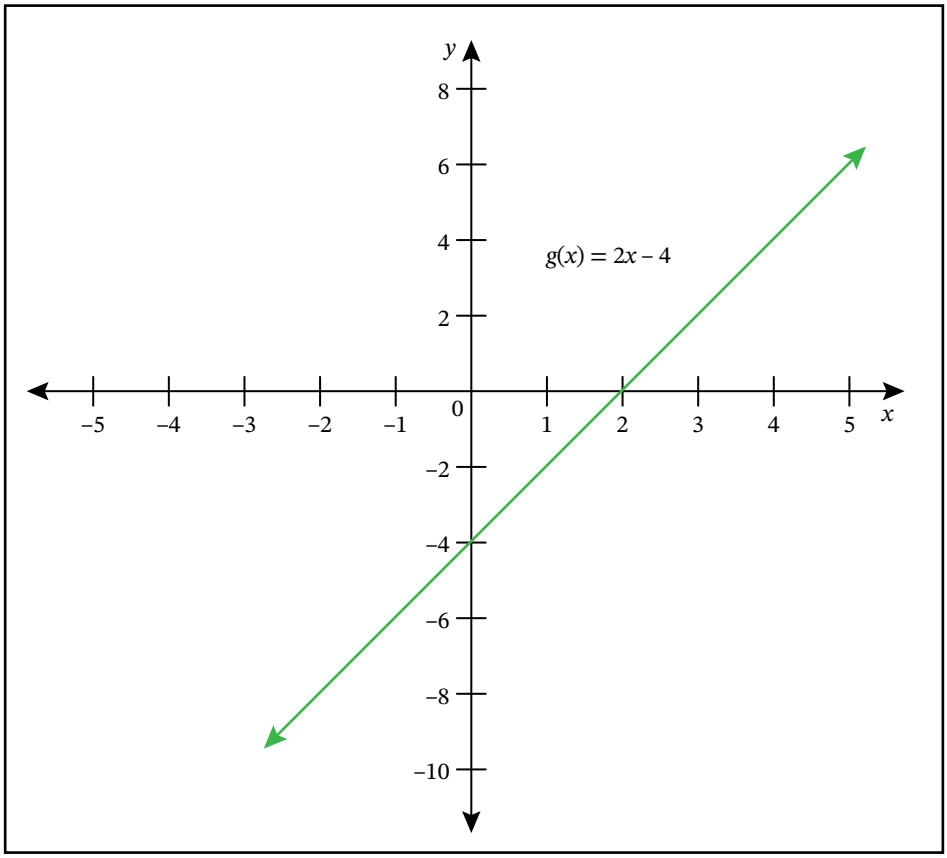
Chapter 2: **Functions and Algebra** (Paper 1)

Part A: Functions

Graphs (excluding trig graphs)

QUESTION 1: Straight lines

1.1 The diagram below represents the graphs of $g(x) = 2x - 4$:



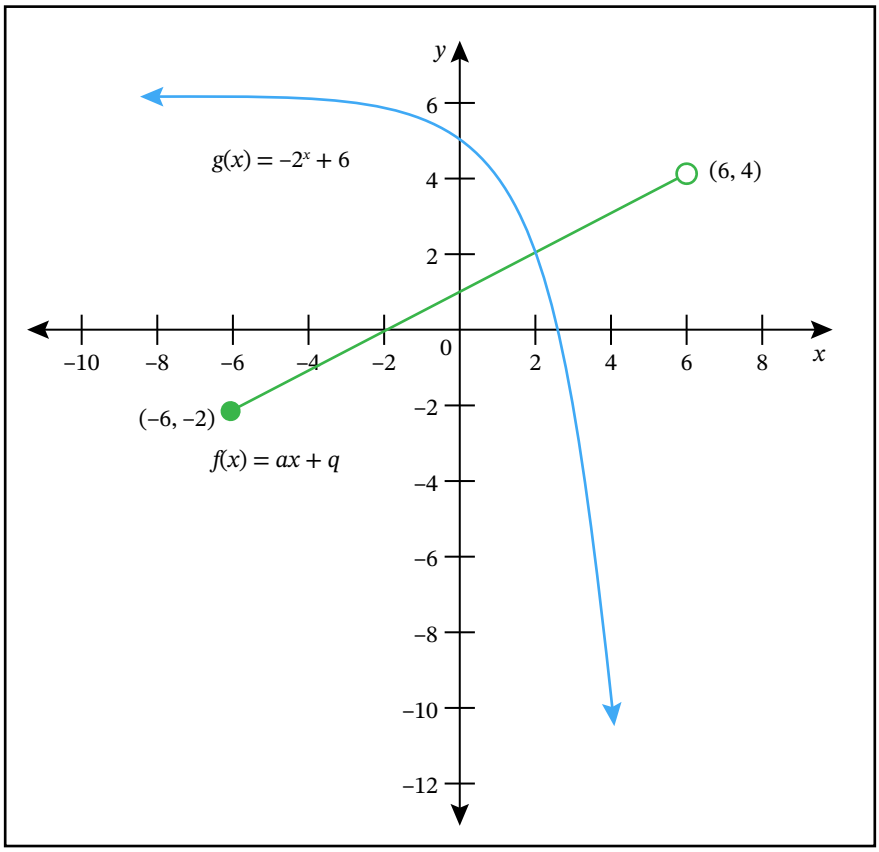
1.1.1 What is the mathematical name for the graph of $g(x)$? (1)

1.1.2 Is the gradient of the graph negative or positive? (1)

1.1.3 Is the graph continuous or discontinuous? (1)

1.2 Various options are given as possible answers to the following questions. Choose the answer and write only the letter (A–D).

The diagram below represents the graphs of $f(x) = ax + q$ and $g(x) = -2^x + 6$.



1.2.1 Which statement correctly describes the horizontal asymptote for the graph $g(x)$?

A $y = 6$

B $y \in R$

C $x = 6$

D $x = 4$ (1)

1.2.2 Which set describes the range of graph $g(x)$ the best?

A $y \in [-6; 6)$ where $y \in R$

B $y \in [-2; 4)$ where $y \in R$

C $y \in (-\infty; 6]$ where $y \in R$

D $y \in (-\infty; 6)$ where $y \in R$ (1)

1.2.3 Which statement regarding graph $g(x)$ is true?

A $g(x)$ is a function.

B $g(x)$ is discontinuous.

C $g(x)$ has an amplitude of 6.

D $g(x)$ is a semi-hyperbola. (1)

1.2.4 In the graph $f(x)$: $y = ax + q$, an increase in the q-value will cause a ...

A horizontal transformation in the graph to the left.

B horizontal transformation in the graph to the right.

C vertical transformation in the graph upwards.

D vertical transformation in the graph downwards. (1)

1.2.5 Which domain-and-range pairs corresponds to the given constraints as illustrated on $f(x)$: $y = ax + q$?

A Domain: $x \in (-6; 6]$ where $x \in R$ and range: $y \in (-6; 4)$ where $y \in R$

B Domain: $x \in (-6; 6]$ where $x \in R$ and range: $y \in (-8; 8)$ where $y \in R$

C Domain: $x \in [-6; 6)$ where $x \in R$ and range: $y \in [-2; 4)$ where $y \in R$

D Domain: $x \in [-6; 6)$ where $x \in Z$ and range: $y \in [-6; 4)$ where $y \in Z$ (1)

1.2.6 Consider $f(x)$: $y = ax + q$.

The x-intercept is at the point ...

A (0; 1)

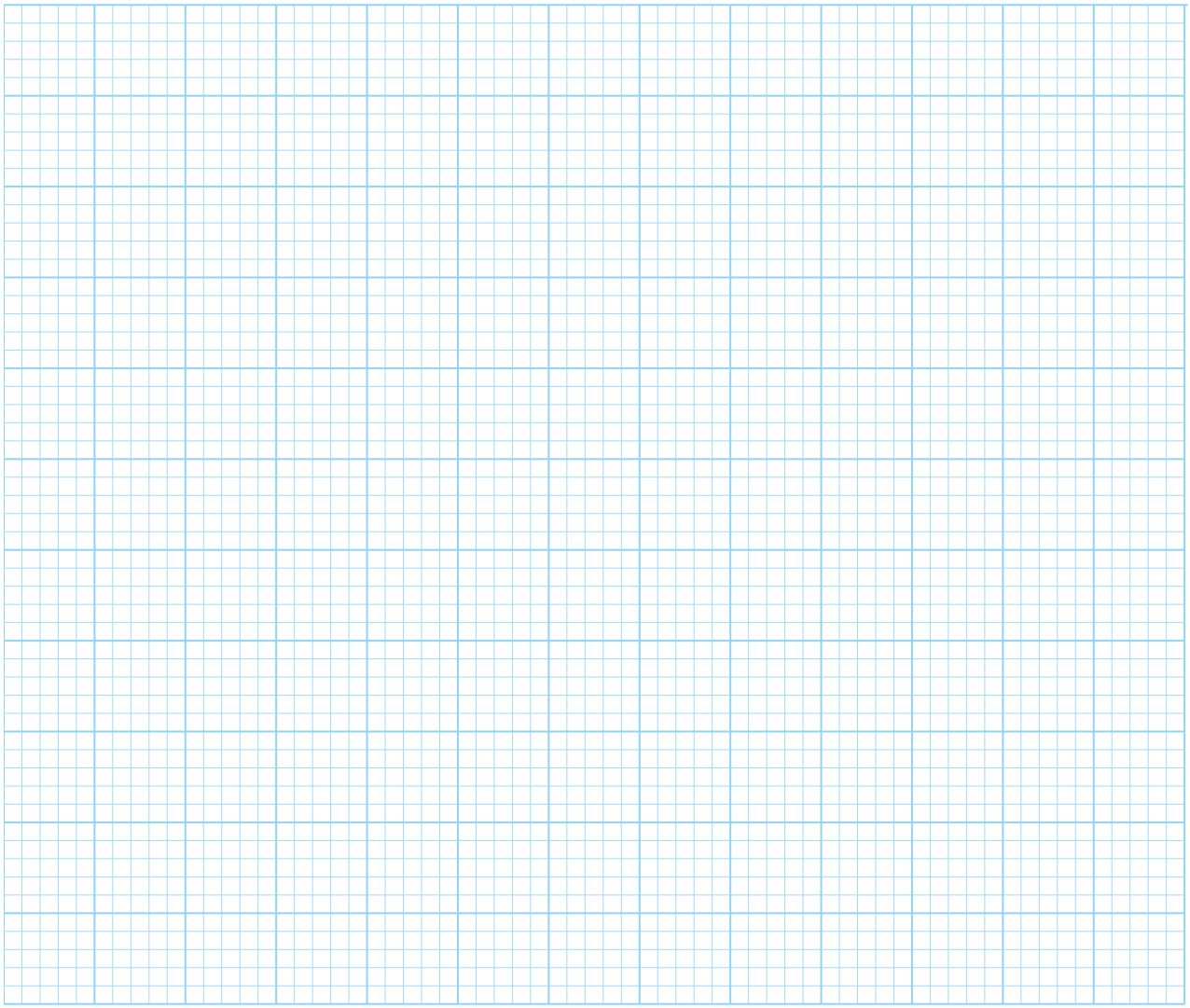
B (1; 0)

C (0; –2)

D (–2; 0) (1)

1.3 Given: $y = -\frac{1}{2}x + 3$

1.3.1 Sketch the graph for the domain $[x \mid x \in R; -2 \leq x < 8]$ by using the table method. Clearly show coordinates of the endpoints and the nature of the points. Draw the graph on the diagram below. (3)



1.3.2 Write down the range for $y = -\frac{1}{2}x + 3$ (2)

1.4 The domain of $y = \frac{3}{x} - 2$ is:

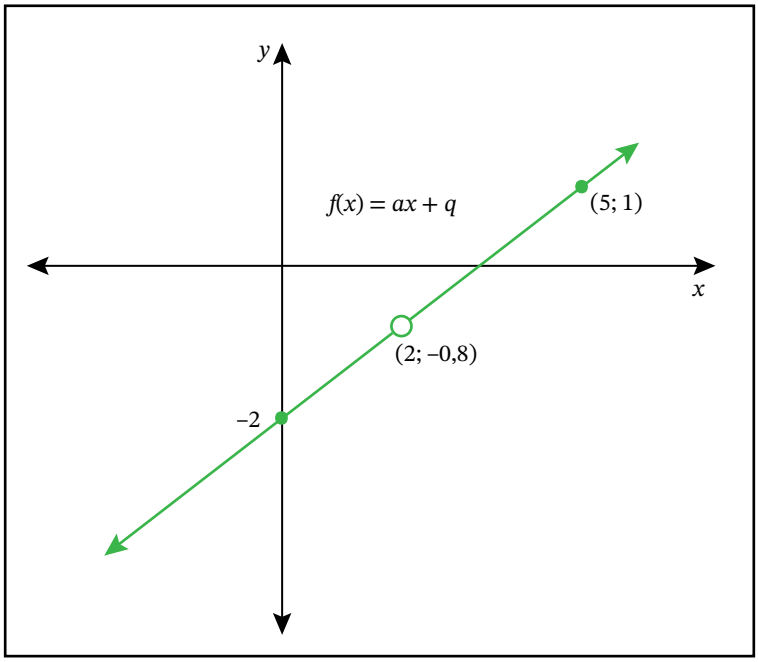
A Domain = $\{x; x \neq 0; x \in E\}$

B Domain = $\{y; y \neq -2; y \in R\}$

C Domain = $\{x; x \neq 3; x \in R\}$

D Domain = $\{x; x \neq -2; x \in R\}$ (1)

1.5 The diagram given below represents the graph of $f(x) = ax + q$



1.5.1 Determine the equation for $f(x)$. (2)

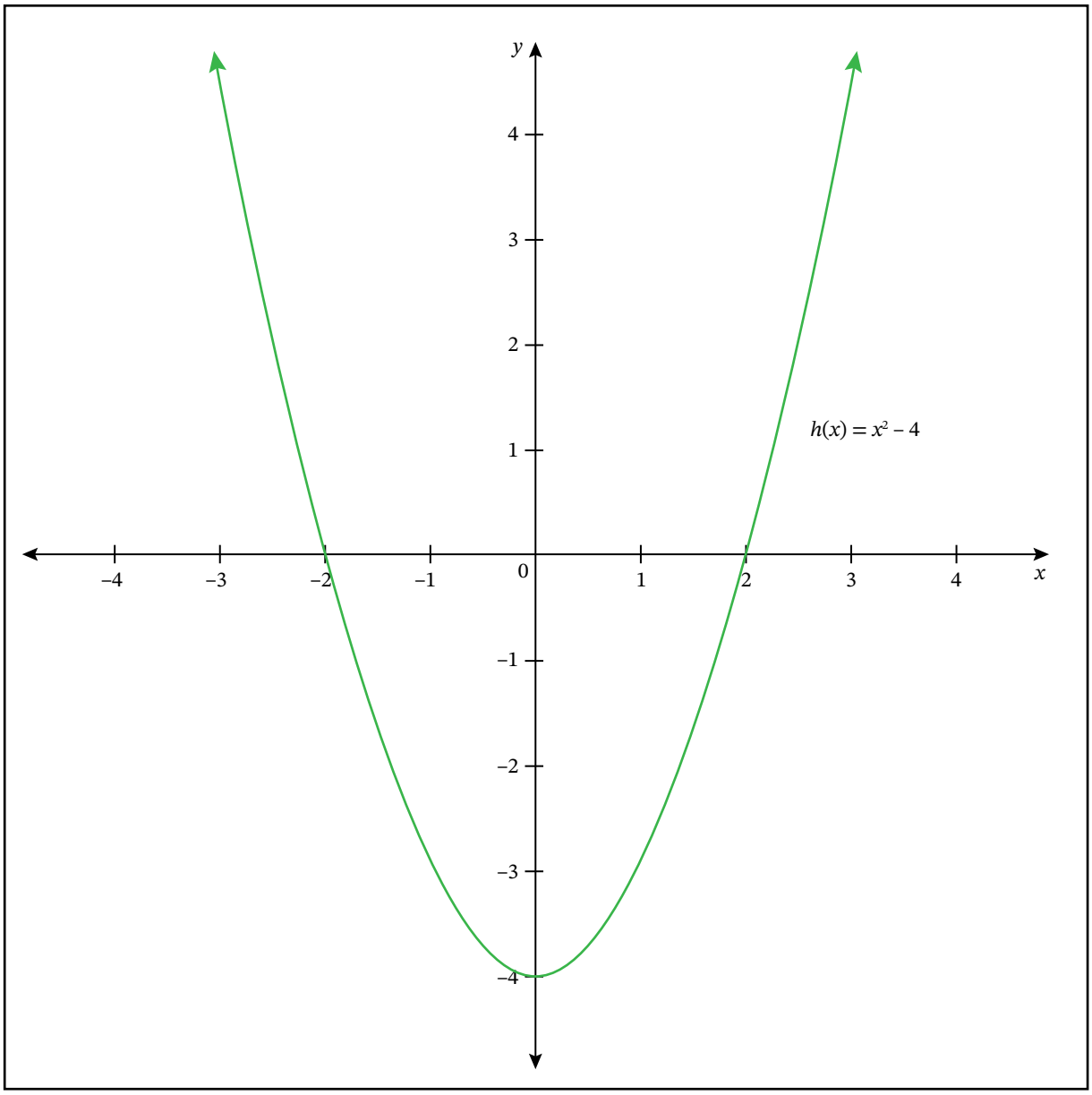
1.5.2 What is the name of the graph $f(x)$? (1)

1.5.3 Write down the domain for $f(x)$. (2)

1.5.4 Is $f(x)$ continuous or discontinuous? Give a reason for the answer. (2)

QUESTION 2: Parabolas

2.1 Given below is the graph of $h(x) = x^2 - 4$



2.1.1 Write down the coordinates of the turning point of the graph. (2)

2.1.2 What are the x-intercepts of the graph? (2)

2.1.3 What is the axis of symmetry for this graph? (1)

2.1.4 Is the graph continuous or discontinuous? (1)

2.1.5 Is this graph a function or relation? (1)

2.1.6 What is the mathematical name for the graph of $h(x)$? (1)

2.2 Given: $y = 12 - 3x^2$

Determine the following:

2.2.1 The x-intercepts (3)

2.2.2 The y-intercept (2)

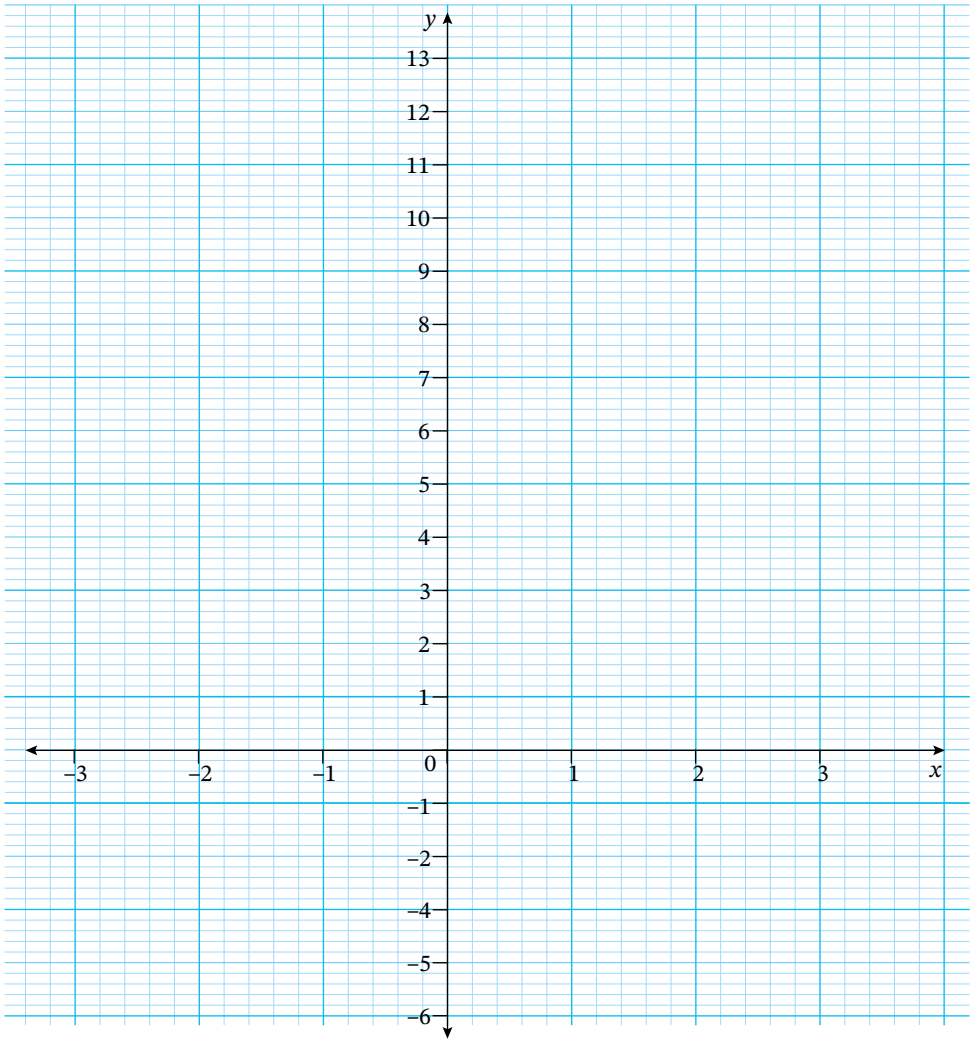
2.2.3 The axis of symmetry (2)

2.2.4 The turning point (2)

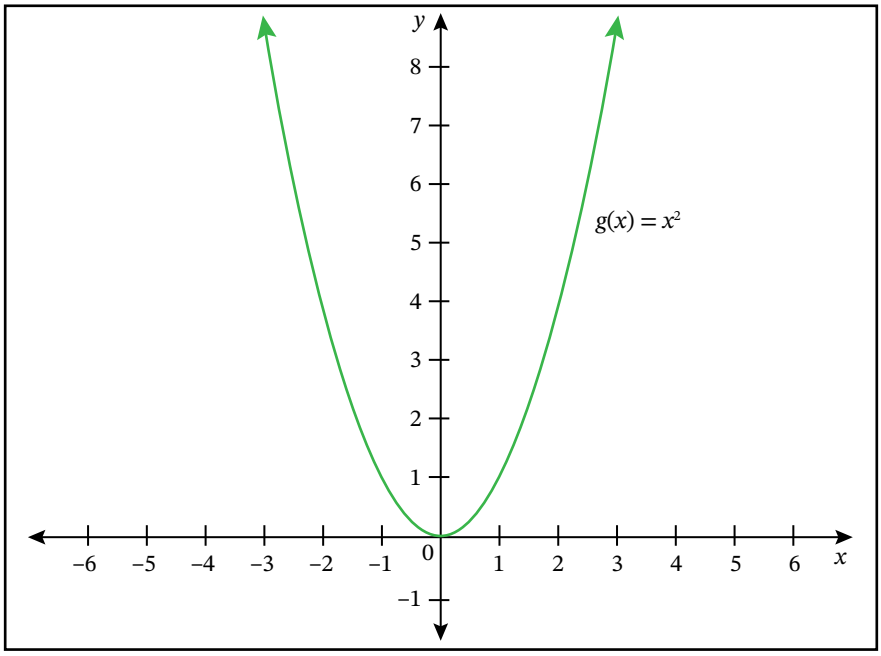
2.2.5 The range of the graph (1)

2.2.6 The domain of the graph (1)

2.2.7 Sketch the graph of $y = 4 - 3x^2$ in the diagram below. (3)



2.3 Given below is the graph of $g(x) = x^2$



2.3.1 What type of function is represented in $g(x)$? (1)

2.3.2 Is the graph of $g(x)$ continuous or discontinuous? (1)

2.3.3 What is the equation of the axis of symmetry for the graph of $g(x)$? (1)

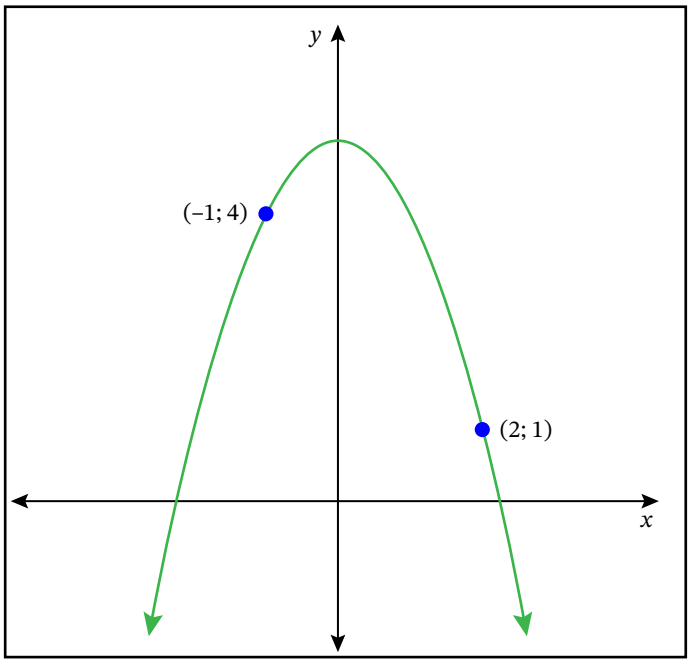
2.3.4 Is the graph of $g(x)$ a function or a non-function?
Give a reason for your answer. (2)

2.3.5 Write down the domain and range for $g(x)$. (2)

2.3.6 Write down the y-intercept. (1)

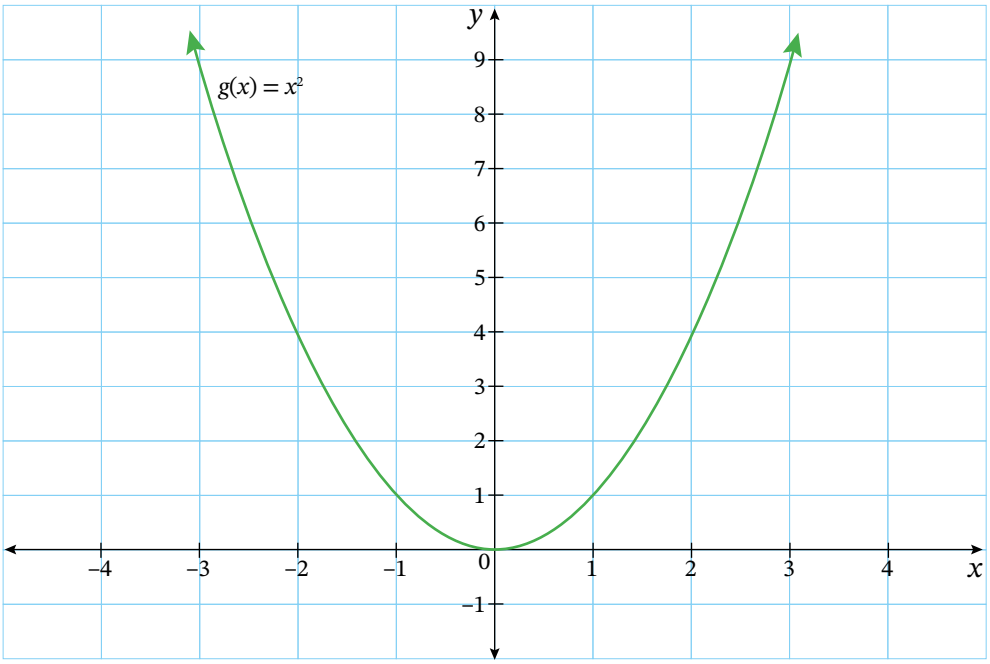
2.3.7 Write down the equation of $g(x)$ if the graph moves one unit down. (2)

2.4 Find the equation of the parabola passing through points (–1; 4) and (2; 1).



(8)

2.5 Given below is the graph of $g(x) = x^2$



2.5.1 What is the mathematical name for the graph of $g(x)$? (1)

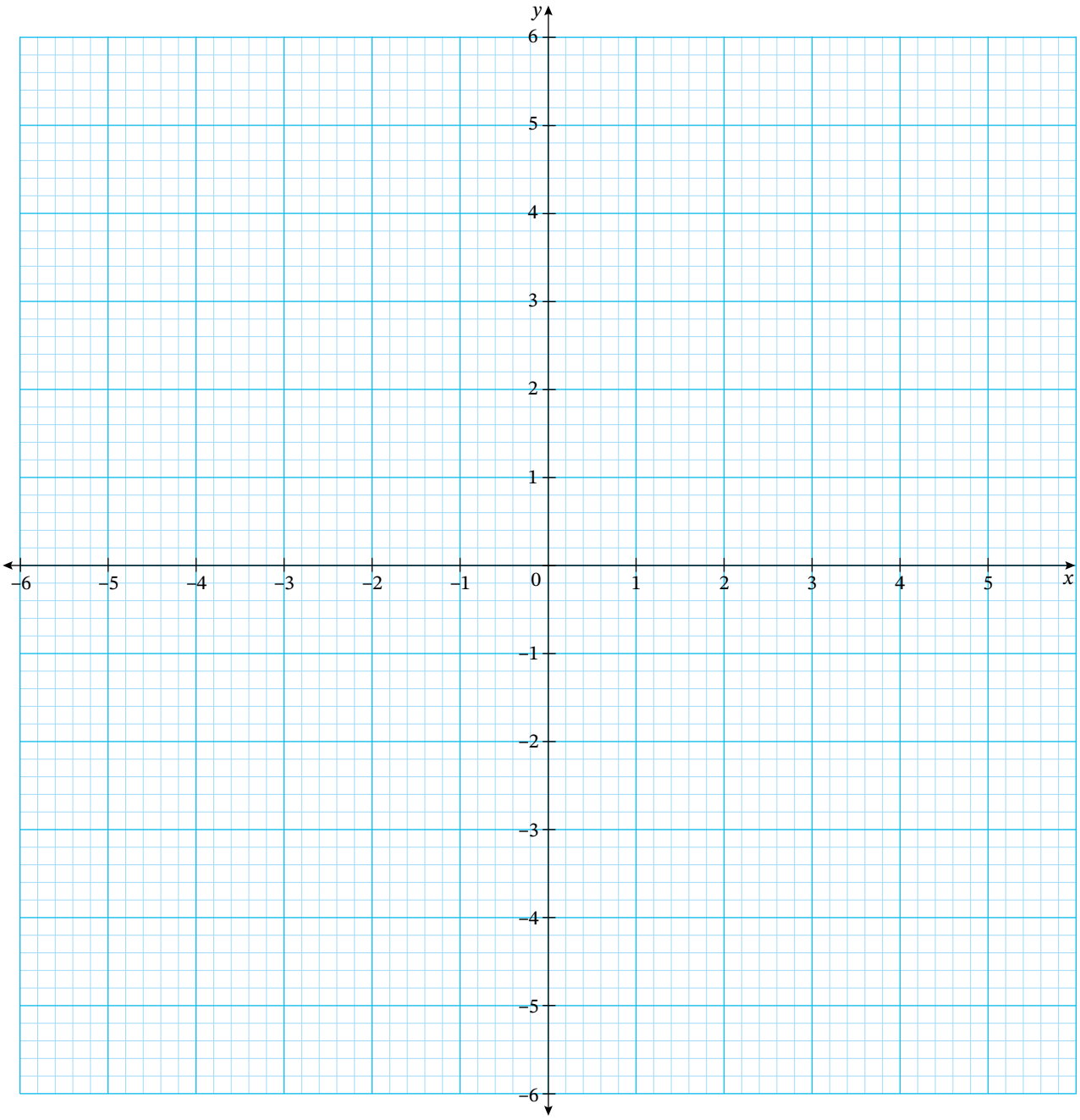
2.5.2 Write down the coordinates of the turning point for $g(x)$. (1)

2.5.3 What is the axis of symmetry for the graph of $g(x)$? (1)

2.5.4 Is the graph of $g(x)$ a function or nonfunction? Give a reason. (2)

2.5.5 Write down the equation of y if the graph is shifted down 2, so that the turning point is (0; –2). (1)

2.6 Use the diagram below to answer the following questions.



2.6.1 Complete the table for the function $f(x) = 2x^2 + 3$ by determining the y-values for the corresponding x-values. (2)

x	–2	–1	0	1	2
$g(x) = 2x^2 + 3$	11				

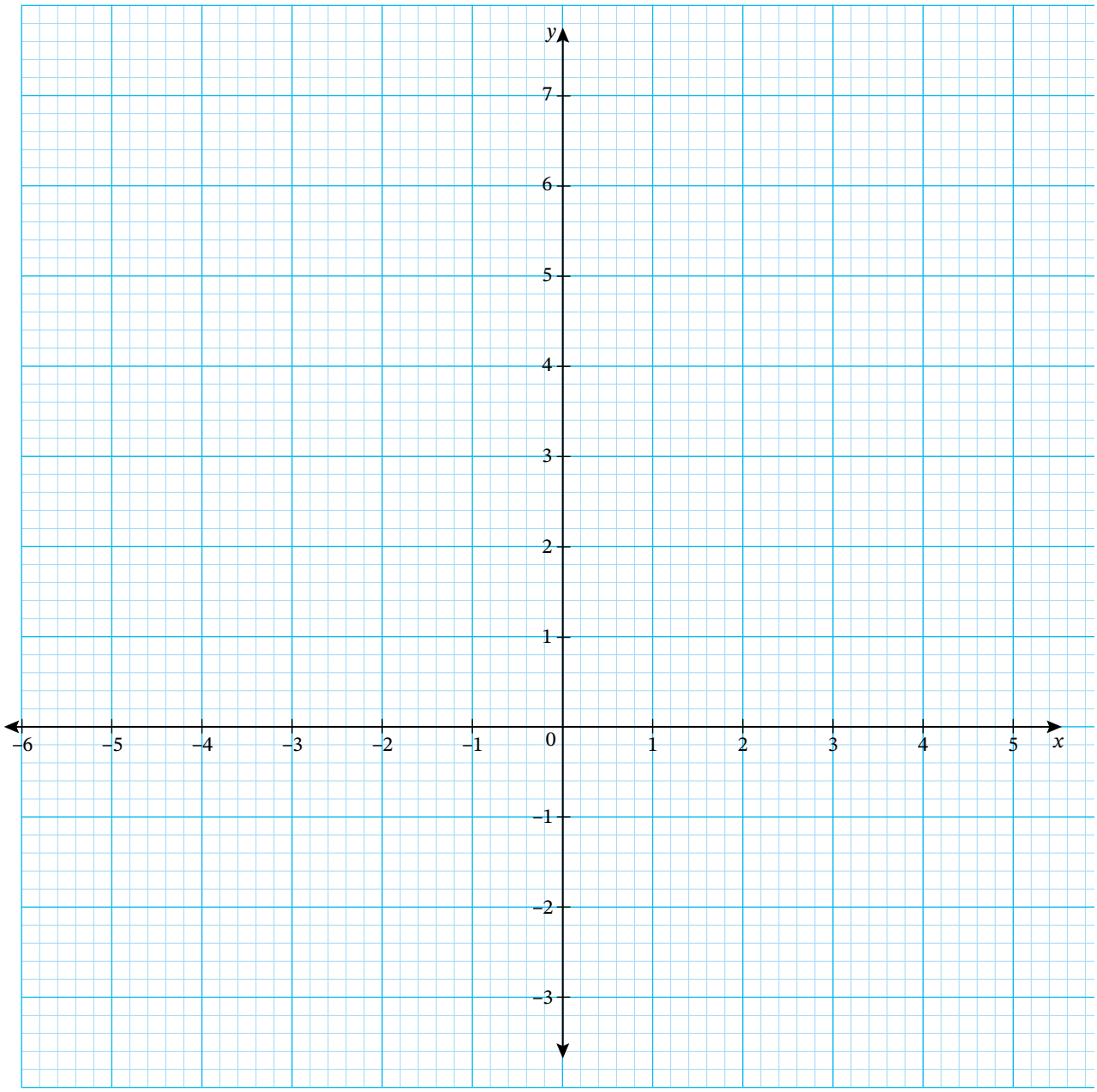
2.6.2 Sketch the graph of $f(x) = 2x^2 + 3$. (3)

2.6.3 Complete the table for the function $g(x) = -2x^2 + 3$ by determining the y-values for the corresponding x-values. (2)

x	–2	–1	0	1	2
$g(x) = -2x^2 + 3$					–5

2.6.4 Draw the graph of $g(x) = -2x^2 + 3$ on the same system of axes used in the previous questions. Clearly label the graphs. (3)

2.6.2 and 2.6.4



2.7 Given $f(x) = -x^2 + 4$ and $h(x) = 2x$

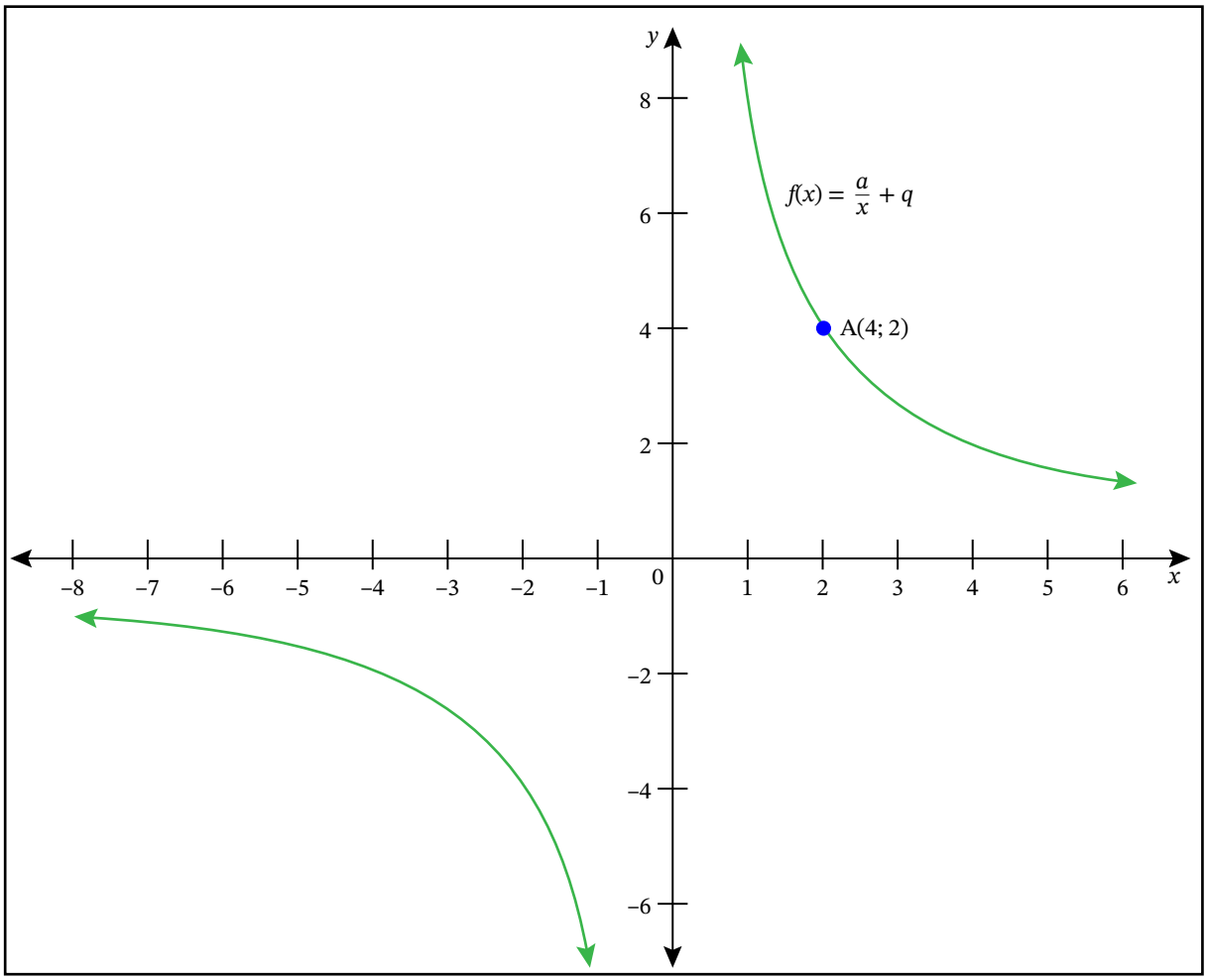
Sketch the graphs of $f(x)$ and $h(x)$ for the domain $x \in \mathbb{R}$ using the table method. Clearly show coordinates of turning points and the x- and y-intercepts. Draw both graphs on the same system of axes on the diagram below. Complete the tables below to assist you in plotting the graph. (5)

x	–3	–2	–1	0	1	2	3
$f(x) = -x^2 + 4$							

x	–2	–1	0	1	2
$h(x) = 2x$					

QUESTION 3: Hyperbolas

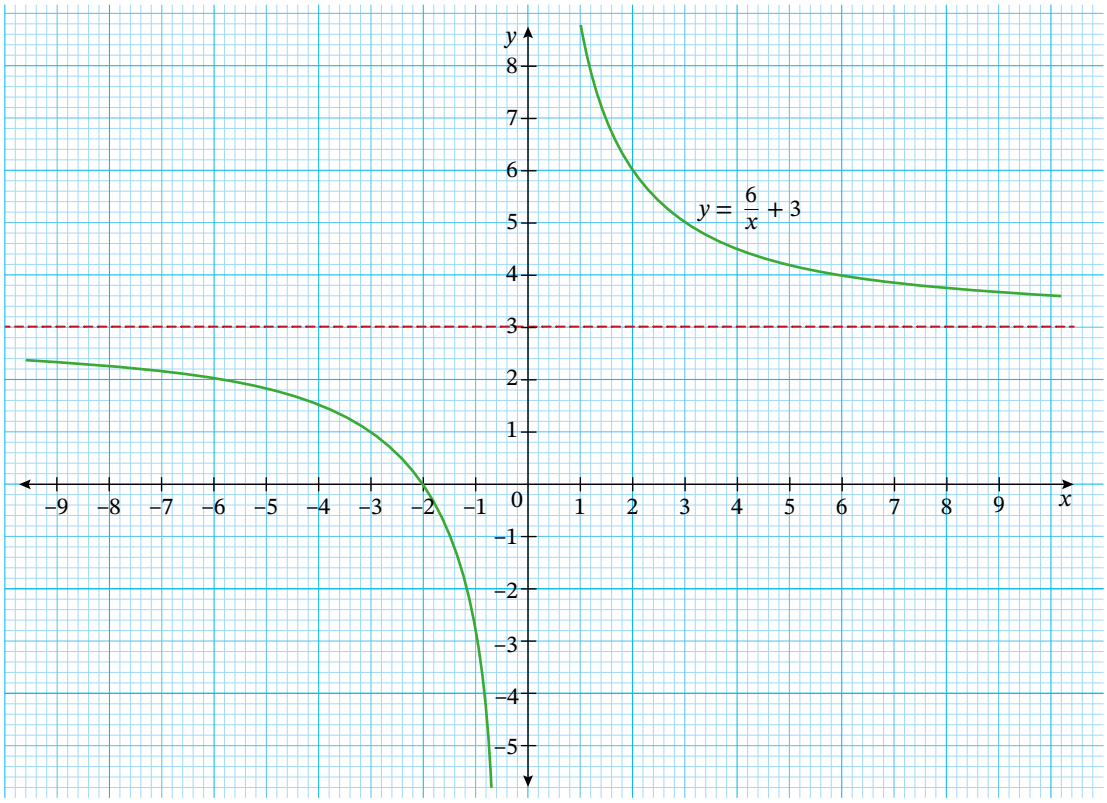
3.1 The following diagram represents the graph of $f(x) = \frac{a}{x} + q$
A(4; 2) is a point on the graph.



3.1.1 What is the mathematical name for the graph of (x)? (1)

3.1.2 Determine the equation of the graph. (3)

3.2 Given below is the graph of $f(x) = \frac{6}{x} + 3$. Study the graph and answer the questions.



3.2.1 Give the mathematical name of the graph. (1)

3.2.2 Write down the domain and range of this graph. (2)

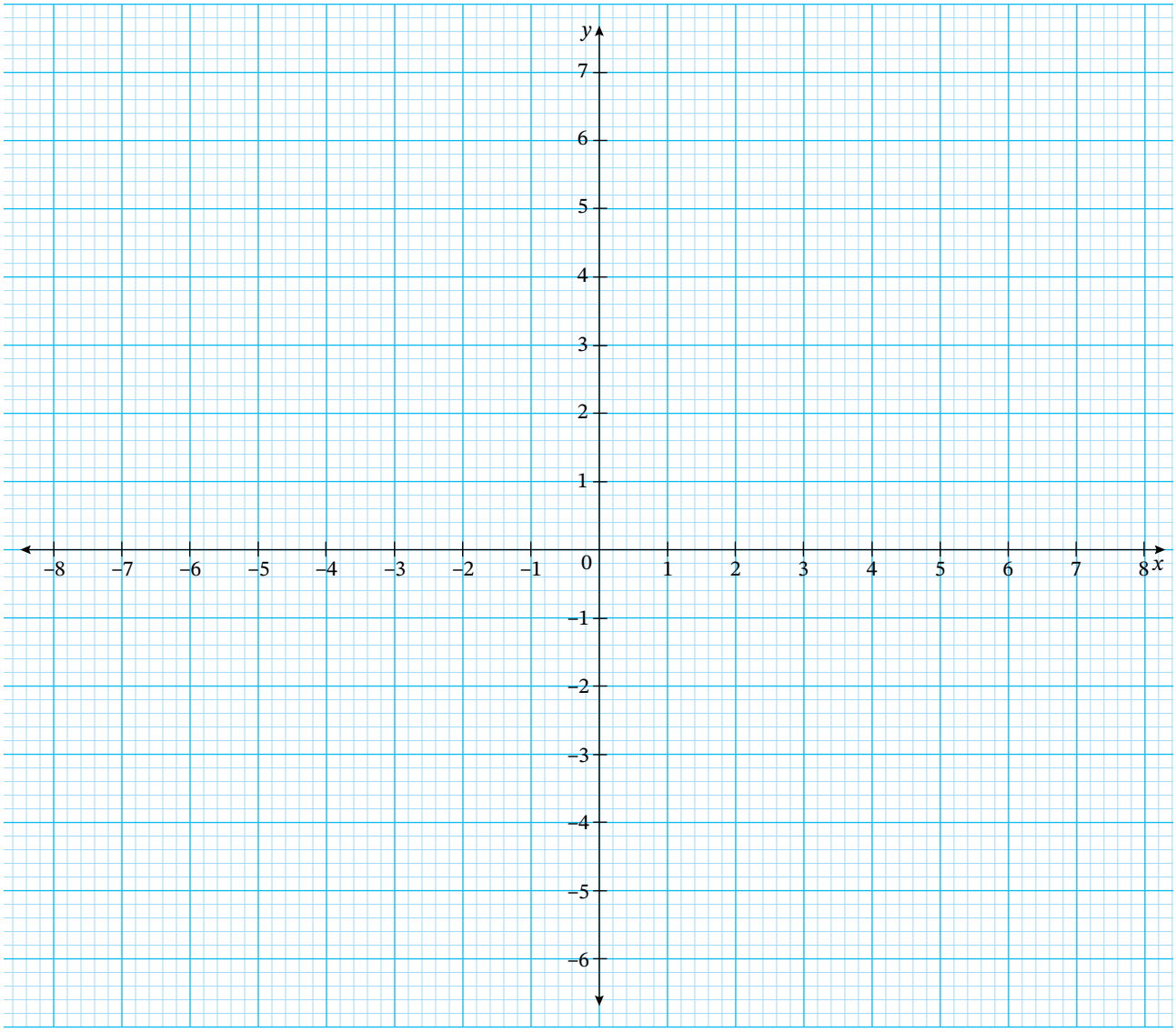
3.2.3 Is the graph continuous or discontinuous? Substantiate your answer. (2)

3.2.4 Is the graph a function or a relation? Substantiate your answer. (2)

3.3 Given: $f(x) = \frac{4}{x} + 2$

3.3.1 What is the mathematical name for the graph of $f(x)$? (1)

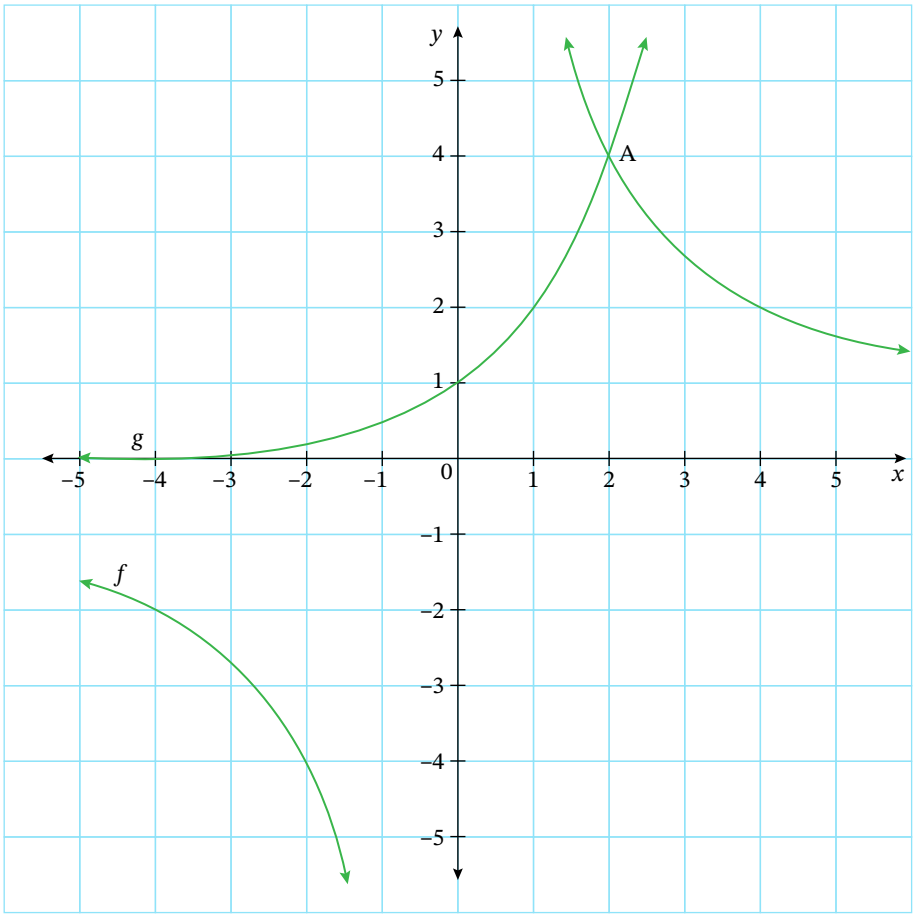
3.3.2 Use the diagram below to sketch the graph of $f(x)$. (4)



3.3.3 Write down the range of $f(x)$. (1)

3.3.4 Is the graph continuous or discontinuous? (1)

3.4 Sketched below are the graphs of $f(x) = \frac{k}{x}$ and $g(x) = 2^x$ with coordinates of A(2; 4).



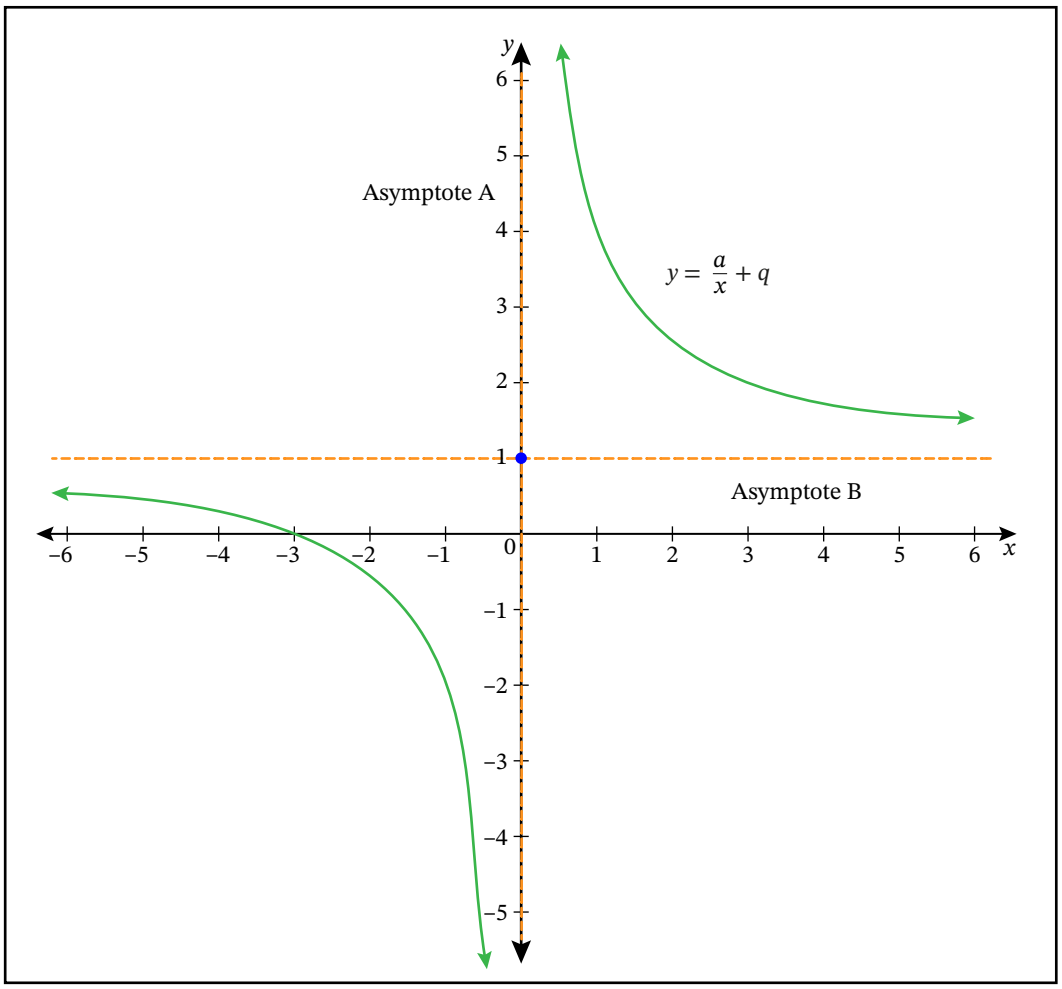
3.4.1 What is the mathematical name for the graph of $f(x)$? (1)

3.4.2 Determine the equation of $f(x)$. (3)

3.4.3 What is the mathematical name for the graph of $g(x)$? (1)

3.4.4 Determine the y-intercept, the domain and the range of $g(x)$. (3)

3.5 The following diagram represents the graph $y = \frac{a}{x} + q$



3.5.1 Indicate whether the following statements are TRUE or FALSE.
Write only 'True' or 'False' next to the question number.

(a) This is an exponential graph.

(b) The graph is discontinuous.

(c) The domain for this graph is $x \in R$.

(d) In the equation $y = \frac{a}{x} + q$ the q-value represents the vertical asymptote.

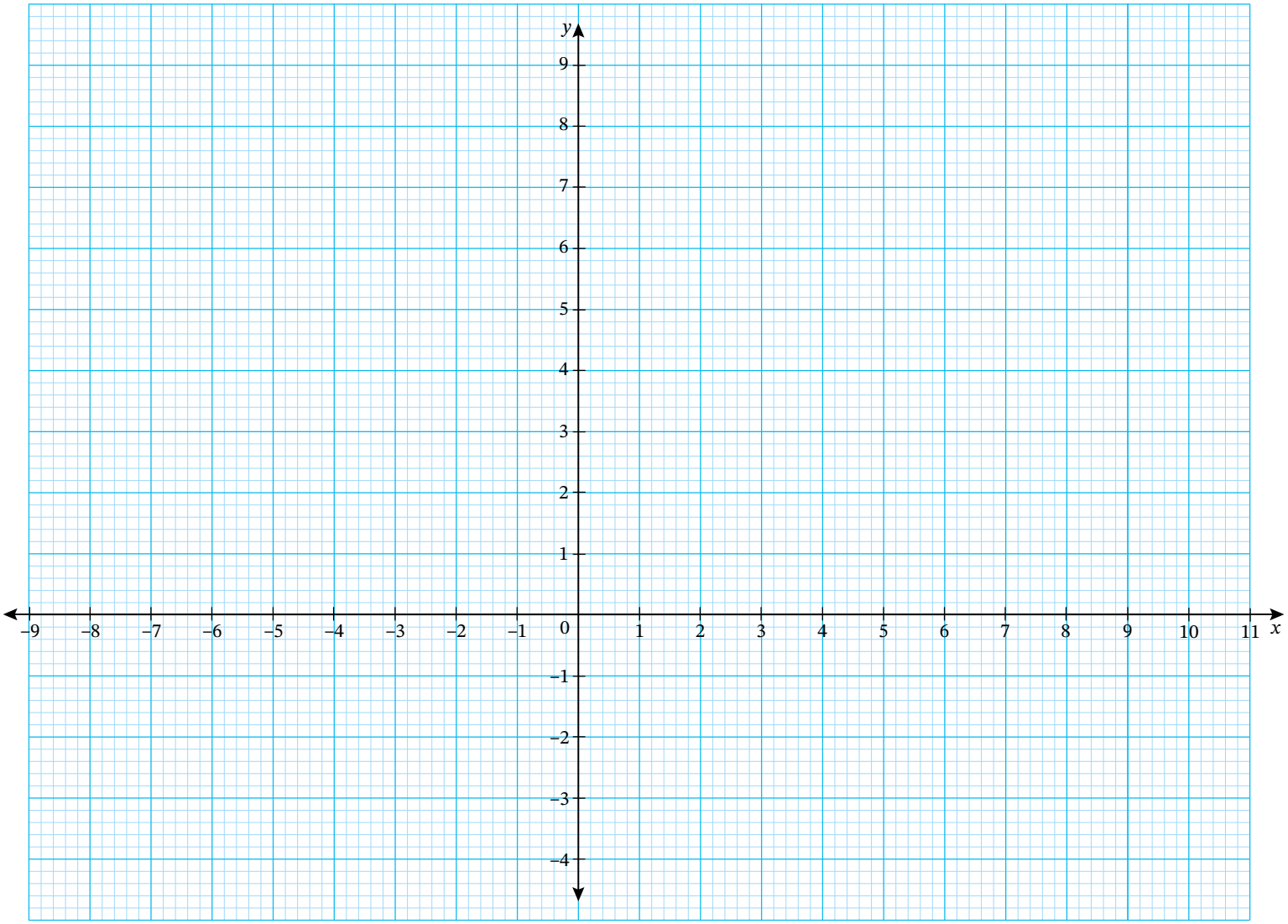
(e) The graph is a non-function. (5 × 1) (5)

3.5.2 Determine the values of a and q in the equation $y = \frac{a}{x} + q$ for the graph. (2)

3.5.3 Write down the equations for the asymptotes of the graph. (2)

3.6 Given $f(x) = \frac{-2}{x} + 3$ and $g(x) = 2x$

3.6.1 On the diagam below and on the same system of axis, clearly sketch the graphs (by using the table method) of
$f(x)$ for the domain $x \neq R, x \neq 0$ and
$g(x)$ for the domain: $\{x \mid -2 \leq x < 4; x \in R\}$.
Clearly show the coordinates of the end points and their nature. (5)



3.6.2 Write down the range for $f(x)$. (2)

3.6.3 Write down the equations for the asymptotes of $f(x) = \frac{-2}{x} + 3$ (2)

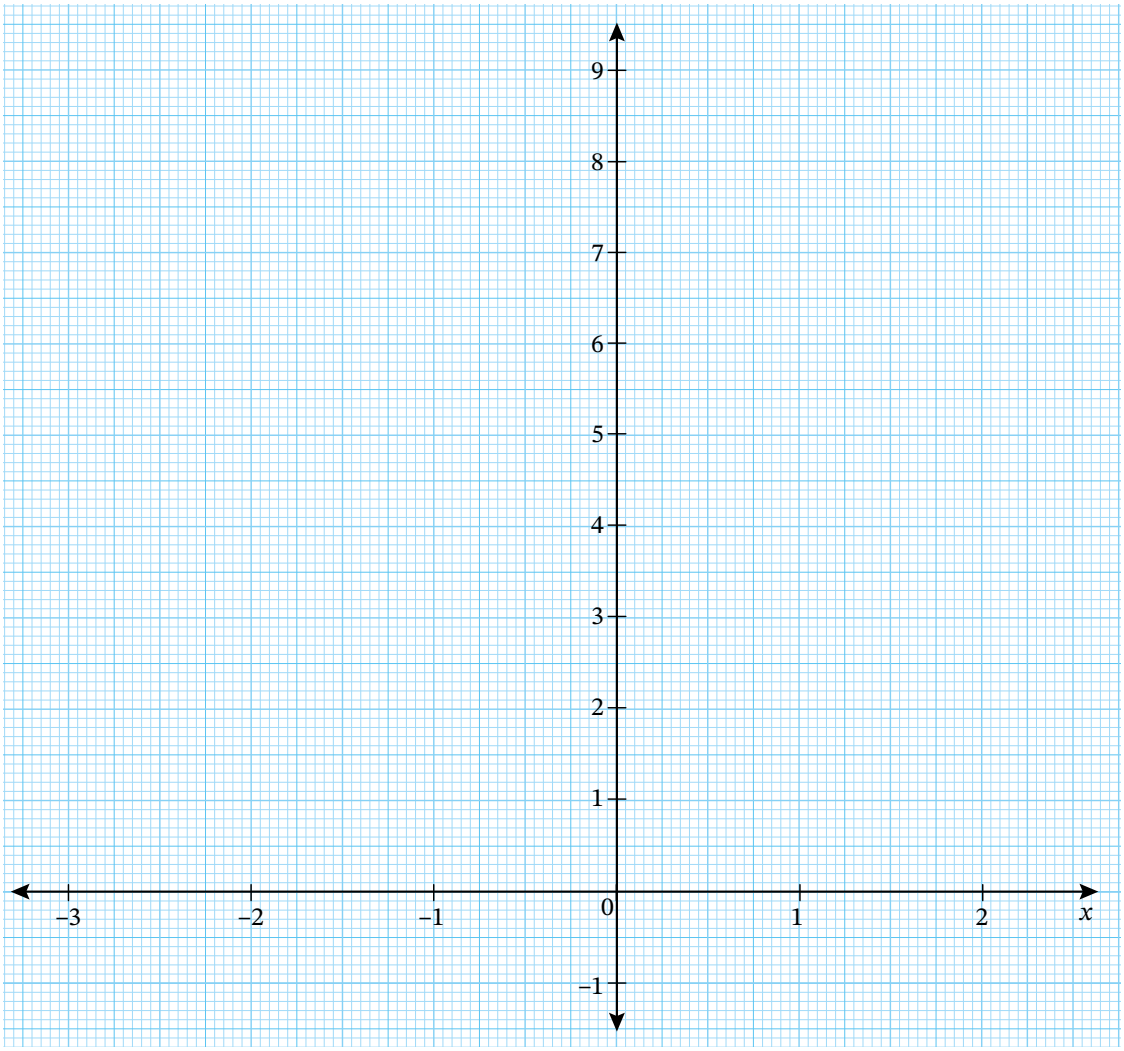
3.6.4 What will be the effect on the graph of $f(x) = \frac{a}{x} + q$, if the sign for the x-variable a changes to a positive. (1)

QUESTION 4: Exponential curves

4.1 Given the function of $y = 3^x$.

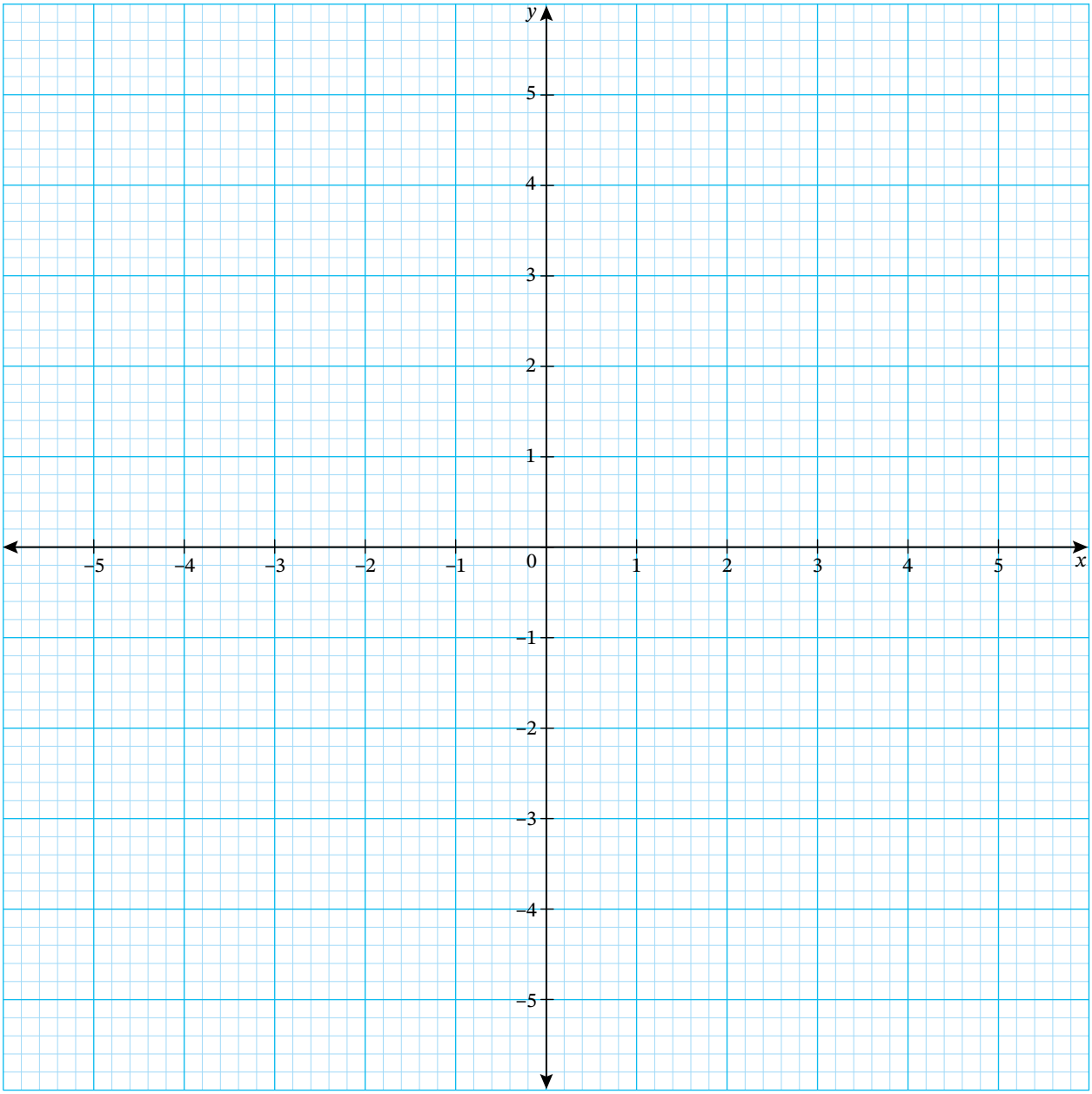
4.1.1 Tabulate values of x for $-2 \leq x \leq 2$, x an integer, and calculate the corresponding y-values if $y = 3^x$ (5)

4.1.2 Use the values in QUESTION 4.1.1 and sketch the graph of $y = 3^x$ on the diagram below. (3)

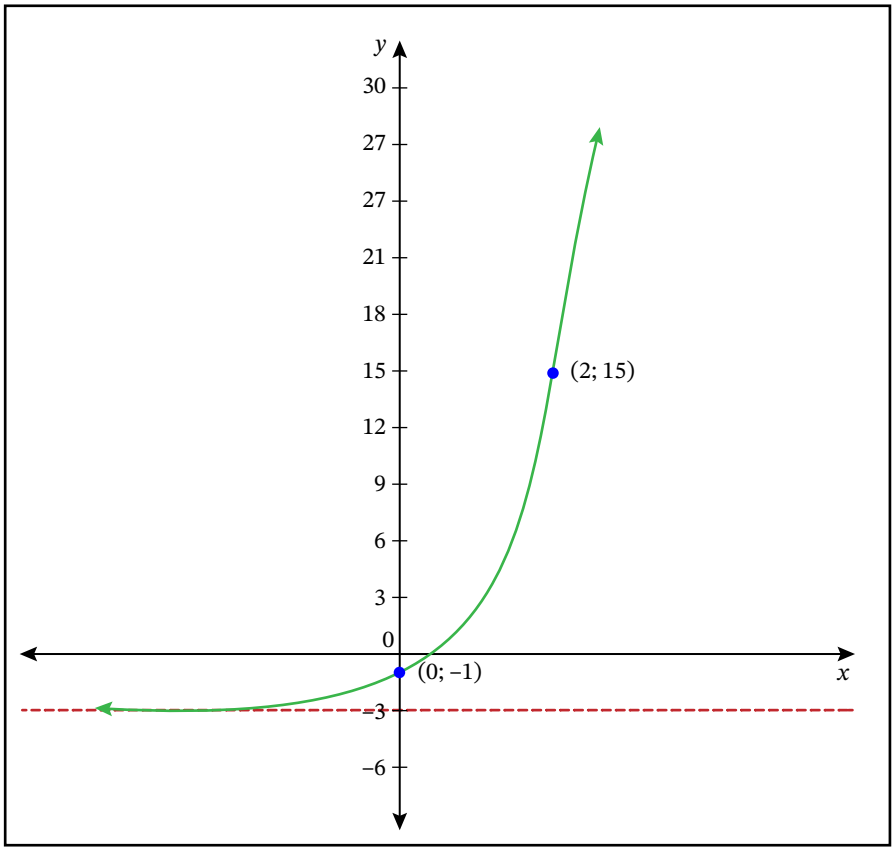


4.1.3 Is the graph drawn in QUESTION 4.1.2 continuous or discontinuous? (1)

4.2 Use the diagam below to sketch the graph of $y = 3^x - 5$ (4)



4.3 Study the graph below to answer the questions.



Various options are given as possible answers to the following questions. Choose the answer and write only the letter (A–D).

4.3.1 Which statement correctly describes the horizontal asymptote for the given graph?

A $y = 0$

B $y = -3$

C $x = -3$

D $y = -x$

4.3.2 Which set describes the range the best?

A $y \in R$

B $y \in [-3; +\infty]$ where $y \in R$

C $x \in (-\infty; +\infty)$ where $x \in R$

D $y \in (-3; +\infty)$ where $y \in R$

4.3.3 Which statement is true with reference to the above graph?

A $g(x)$ has an asymptote at $x = 2$

B $g(x)$ is discontinuous

C $g(x)$ has an amplitude of 3

D The name of $g(x)$ is an exponential graph

4.3.4 The graph of $g(x) = ab^x + q$ is ...

A increasing.

B decreasing.

C discontinuous.

D a non-function.

4.3.5 The equation of $g(x)$ is ...

A $g(x) = 4^x - 1$

B $g(x) = 8x - 1$

C $g(x) = 2.3^x - 3$

D $g(x) = \frac{1}{8}x - 1$

4.3.6 What is the input value, x, for which $g(x) = -3$ for the graph of $g(x)$?

A $x = 0$

B $x = -3$

C $y = 0$

D Does not exist

4.3.7 If given the graph $y = ab^x + q$, the a-value will determine the ...

A horizontal transformation in the graph.

B steepness and direction of the graph.

C ange and domain of the graph.

D vertical transformation. (7 × 1) (7)

Part B: Algebra

QUESTION 1: Simplify algebraic expressions

1.1 Simplify the following:

1.1.1 $(x^2 - 1)^2 - 1$ (3)

1.1.2 $(-x^2 - 2x)(-x + 3)$ (2)

1.1.3 $((2x + 2)(-x))^2$ (3)

1.2 Simplify the following:

1.2.1 $\frac{4p^2 + 4p}{4p} \times \frac{p - 1}{1}$ (3)

1.2.2 $(-2x + 3)(x^2 + 3x - 8)$ (3)

1.3 Simplify the following:

1.3.1 $(r + s - 1)(r + s)$ (2)

1.3.2 $(p^3 - 1)^2 - 3p^3(p^3 + 2) - 6p^6$ (3)

1.3.3 $(a^3)^2 \times a^4$ (2)

1.4 Simplify the following:

1.4.1 $(p + q - 1)(p + q)$ (3)

1.4.2 $(a^3 - 1)^2 - 3a^3(a^3 + 2) - 6a^6$ (3)

1.4.3 $(x^3)^2 \times x^4$ (2)

1.5 Which ordered pair is the solution for $y = -2x - 5$?

A Only (1; 7)

B Only (–3; 1)

C Both (1; –7) and (–3; 1)

D Only (1; –7) (1)

1.6 Simplify the following:

1.6.1 $(a + b)^2$ (1)

1.6.2 $(x - 3y)(x^2 + 3xy + 9y^2)$ (2)

1.7 Simplify the following:

1.7.1 $(2x - 3)(2x + 3)$ (1)

1.7.2 $(x^2 + y)(4x + 3xy + x^{-1}y^2)$ (2)

1.8 Express the following in its simplest form:

$\frac{63x^2y - 7x^2y^3}{7x^2y}$ (2)

1.9 Simplify the following expression to its simplest form:

$\frac{6x^3y^2 + 21x^2y^2 + 18xy^2}{18xy^2}$ (3)

QUESTION 2: Factorisation

2.1 Factorise the following:

2.1.1 $3pqx + pqy - 12x - 4y$ (3)

2.1.2 $-64k^2 + 100$ (3)

2.2 Factorise the following:

2.2.1 $9a^2 - b^2$ (2)

2.2.2 $2a^2 - a - 2$ (3)

2.2.3 $2ab - 2a^2 + a - b$ (3)

2.3 Factorise the following:

2.3.1 $2 - 32p^2$ (2)

2.3.2 $6(p - q) + 9p(q - p)$ (4)

2.4 Factorise the following:

2.4.1 $2 - 32a^2$ (2)

2.4.2 $12(a - b) + 18a(b - a)$ (4)

2.5 Factorise the following:

2.5.1 $9x^3 - 16xy^2$ (2)

2.5.2 $6x - 9 + 6xy - 9y$ (2)

2.5.3 $4a^2 - 4a + 1$ (2)

2.6 Factorise the following expressions:

2.6.1 $20x^2 - 45y^2$ (2)

2.6.2 $2x^2 - 5x - 3$ (2)

2.6.3 $5x^2 - 15x + 12y - 4xy$ (3)

QUESTION 3: Solve algebraic equations

3.1 Solve for x.

3.1.1 $(32)^{x-1} = (64)^{2x+1}$ (4)

3.1.2 $-2x - 2 = -3(-2x - 1)$ (3)

3.2 Solve for x in the following equation:

$4.3^{x-3} = 108$ (3)

3.3 Solve for x in the following equations:

3.3.1 $p^{3x-6} = 1$ (2)

3.3.2 $\frac{x+4}{2} = \frac{2x+7}{3}$ (3)

3.4 Solve for x in the following equations:

3.4.1 $a^x = 1$ (2)

3.4.2 $\frac{x}{2} = \frac{x-3}{4}$ (3)

3.5 Solve for x.

3.5.1 $x - (x - 2) + 2(3 - x) = 0$ (2)

3.5.2 $\frac{x+2}{5} - 3 = 2 - \frac{1-3x}{3}$ (3)

3.5.3 $(2^{x+1})^2 = (2^2)^3$ (2)

3.6 Solve for x.

3.6.1 $\frac{2}{x} = \frac{-4}{x+5}$ (2)

3.6.2 $x^2 - 6x + 9 = x - 1$ (2)

3.6.3 $27^{x+1} = 9^{x-2}$ (3)

QUESTION 4: Solve linear inequalities

4.1 Solve the following inequality and represent the solution on a number line.

$4(x + 1) \leq 3x + 8$ (4)

4.2 Solve the following inequality and represent the solution on a number line.

$2(3x - 1) > 4x + 5$ (3)

4.3 Solve the following inequality:

$3x - 2 \leq 2x + 6$ (2)

4.4 Given: $A_T = A_O + A_O \times \frac{r \times t}{100}$

4.4.1 Make A_O the subject of the formula. (2)

4.4.2 If $r = 5$, $A_T = 3\,000$ and $t = 4$, calculate A_O (1)

4.5 Given: $4 \geq 3 - 8x - 11$ where $x \in R$.

4.5.1 Solve the inequality $4 \geq 3 - 8x - 11$. (3)

4.5.2 Represent the solution in interval notation. (1)

4.6 Which ONE of the following represents the inequality $-5 < x \leq -2$ where $x \in R$?

A 

B 

C 

D 

(1)

4.7 Given: $A_t = A_O(1 + rt)$

4.7.1 Make t the subject of the formula. (2)

4.7.2 If t is the time period and given $r = \frac{15}{100}$, $A_t = 2\,625$, $A_O = 1\,500$, determine the time period t of the investment. (1)

4.8 Given: $6 - 5x^3\ 4x - 9$; where $x \in R$.

4.8.1 Solve the inequality $6 - 5x \geq 4x - 9$; where $x \in R$. (2)

4.8.2 Show the answer on a number line. (1)

QUESTION 5: Solve simultaneous equations

5.1 Solve algebraically for x and y simultaneously given the following equations:

$2x - y = 3$

and

$3x - 2y = 1$ (4)

5.2 Solve the following simultaneous linear equations algebraically:

$y = -2x + 4$

and

$y = 2x + 8$ (4)

5.3 Solve algebraically for x and y in the following simultaneous linear equations:

$4x - y = 1$

and

$x + y = 1$ (4)

5.4 Solve the following simultaneous linear equations algebraically:

$x + 2y - 1 = 0$

$x - 2y + 3 = 0$ (4)

5.5 Solve the following system of linear equations algebraically:

$2x = 3y - 4$

$y = x - 3$ (3)

5.6 Solve the following system of linear equations algebraically:

$2x - y = 7$

$3x + 2y = 28$ (3)

Question papers Maths L2

Introduction to Paper 1 and Paper 2

Proposed mark distribution between Paper 1 and Paper 2 for external examination papers

Paper 1	
Topics	**Marks**
1. Numbers	30
2. Functions and Algebra	
2.1 Functions	25
2.2 Algebra	25
5. Financial Mathematics	20
Total	**100**

Paper 2	
Topics	**Marks**
3. Space, Shape and Measurement	
3.1 Geometry	30
3.2 Trigonometry	30
4. Data Handling	40
Total	**100**

Formula sheets

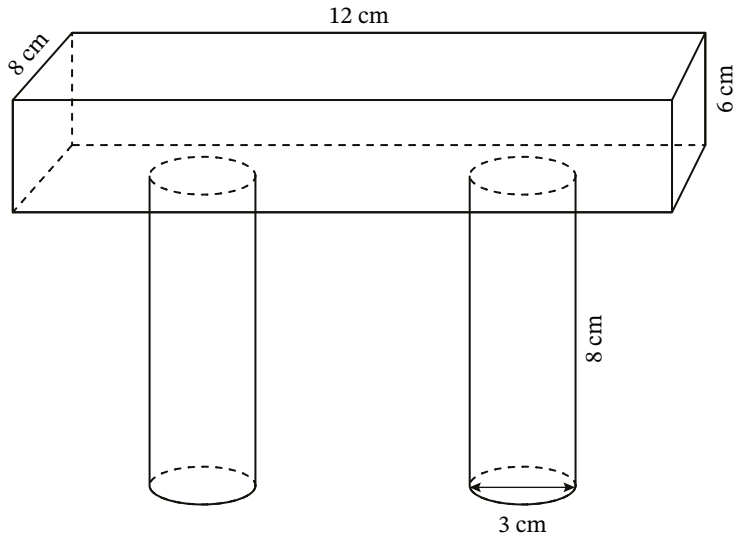
- Paper 1
- Paper 2
- Chapter 3: Space, Shape and Measurement (Paper 2)

Chapter 3: **Space, shape and measurement** (Paper 2)

Part A: Geometry

QUESTION 1: Perimeters, areas and volumes

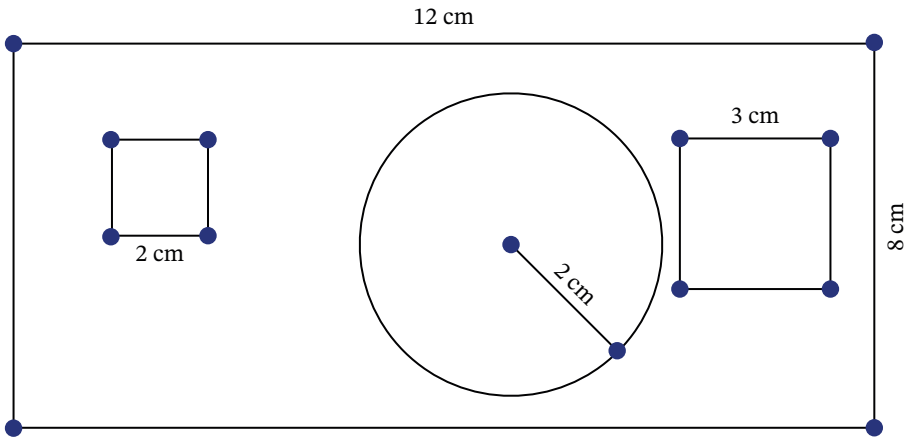
1.1 The sketch below shows a concrete beam in the shape of a rectangular prism with a length of 12 cm, a width of 8 cm and a height of 6 cm. The beam rests on two closed cylinders, each having a diameter of 3 cm and a height of 8 cm.



1.1.1 Determine the surface area of one closed cylinder. (3)

1.1.2 Calculate the total volume of concrete needed to make the beam and the pillars. (7)

1.2 The following diagram shows a metal plate. From the plate, a circle and two squares with the dimensions shown below were cut out.

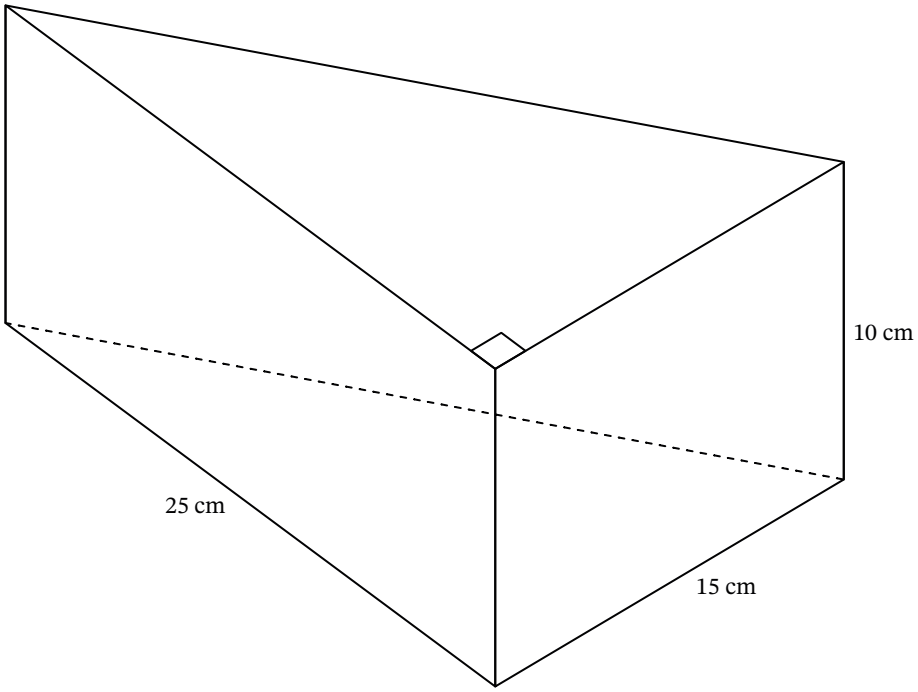


1.2.1 Calculate the area of the circular plate. (2)

1.2.2 Calculate the area of the two squares. (4)

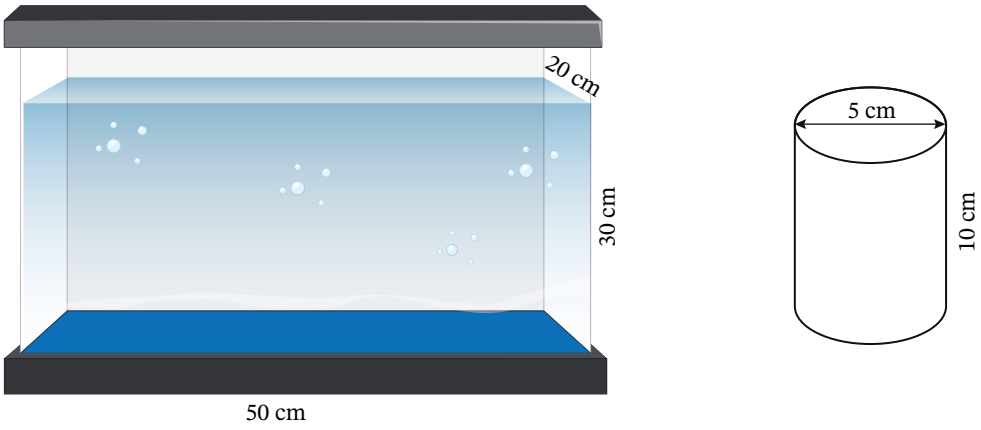
1.2.3 Calculate the area of the rectangular metal plate after cutting the squares and circle out. (3)

1.3 Calculate the volume of the triangular prism shown below.



(4)

1.4 The diagram below shows a glass fish tank in the shape of a rectangular prism with a length of 50 cm, a width of 20 cm and a height of 30 cm. The tank is opened at the top and has been filled with water right to the top. Tom has a solid metal cylinder that has a diameter of 5 cm and a height of 10 cm.

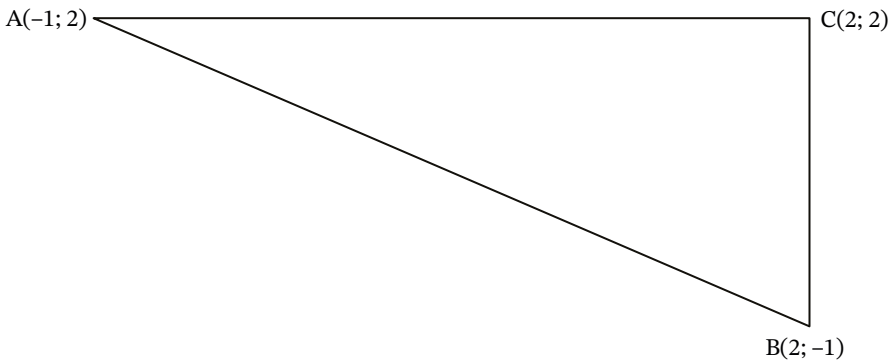


1.4.1 Calculate the outside surface area of the fish tank. (4)

1.4.2 Determine the surface area of the cylinder. (3)

1.4.3 Calculate the volume of water (in cm^3) that will remain in the tank if Tom places the ball into the tank. (5)

1.5

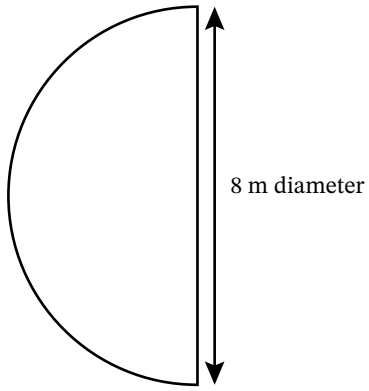


1.5.1 Calculate the length of the line segment BC.
Leave the answer in surd form. (3)

1.5.2 Determine the coordinates of the midpoint (M) of the line segment AC. (2)

1.5.3 Determine the gradient of the line segment AB. (2)

1.6 The following plan is for a vegetable garden that is to be enclosed by a fence. The garden is in the shape of a semi-circle, with a diameter of 8 metres.

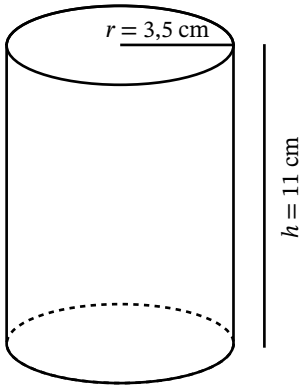


1.6.1 Calculate the area of the vegetable garden. (3)

1.6.2 Determine the perimeter of the garden. (3)

1.6.3 What is the cost of placing a picket fence around the perimeter if it costs R290 per running metre, rounded up to the nearest whole metre? (2)

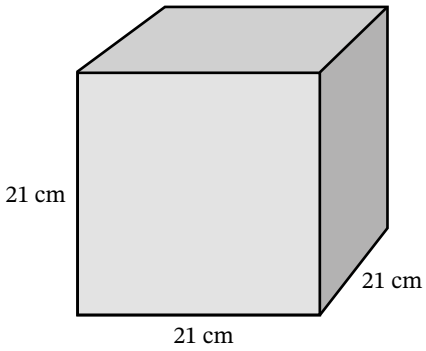
1.7 A cylindrical tin of baked beans has a height of 11 cm and a radius of 3,5 cm.



1.7.1 Calculate the surface area of the baked beans tin. (3)

1.7.2 Calculate the volume the baked beans tin can hold. (2)

1.8 Given a closed cube with 21 cm sides

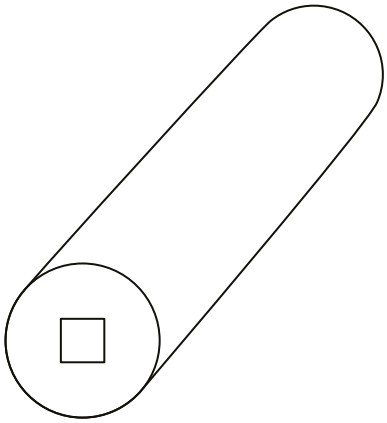


1.8.1 Calculate the volume. (2)

1.8.2 Calculate the total surface area. (2)

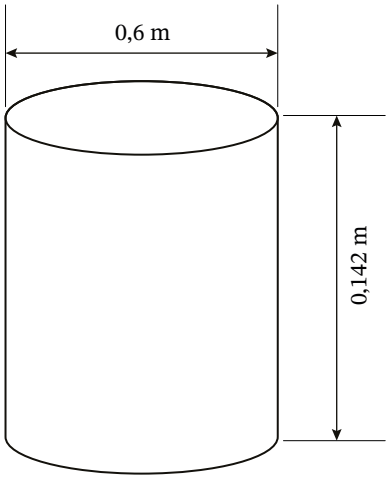
1.9 The perimeter of a rectangle is 42 cm and its breadth is 10 cm.
Calculate the length of the rectangle. (3)

1.10 A steel cylinder has a square hole with 4 cm sides bored through it as shown in the diagram below. The diameter of the cylinder is 6 cm and the length of the cylinder is 10 cm.



Calculate the volume of the steel required to manufacture the cylinder with a square hole through the cylinder. (4)

1.11 Zodwa wants to use the metal cylinder below as a flower pot.



Calculate each of the following regarding the cylinder:

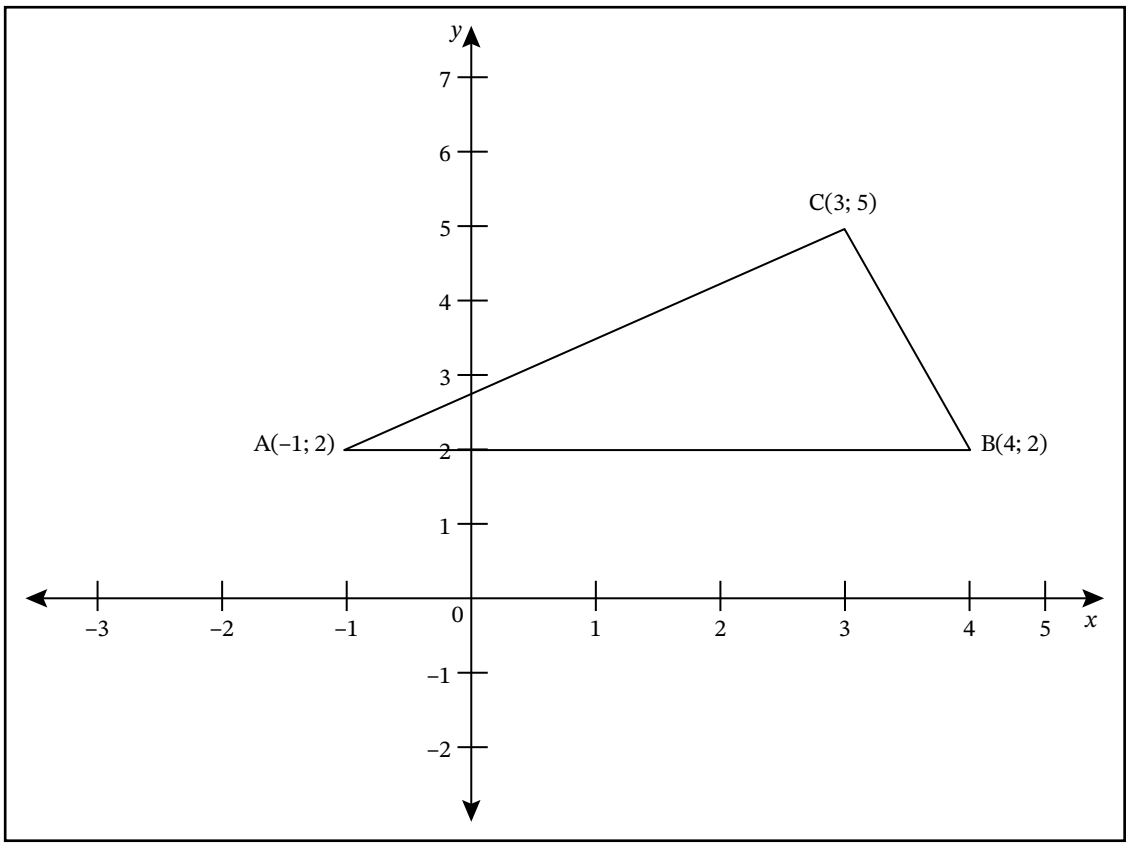
1.11.1 Radius (1)

1.11.2 Circumference (2)

1.11.3 Volume (3)

QUESTION 2: Use the coordinate system to derive and apply equations

2.1 The figure below shows ΔABC with vertices A(–1; 2), B(4; 2) and C(3; 5).



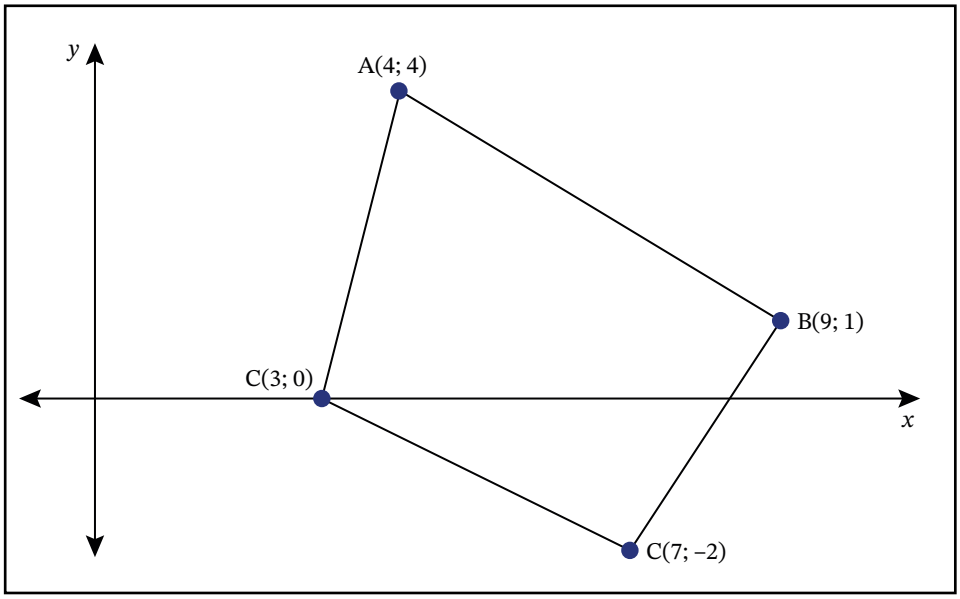
2.1.1 Calculate the length of line segment AC. (3)

2.1.2 Determine the length of line segment BC. (3)

2.1.3 Calculate the coordinates of the midpoint of AC. (3)

2.1.4 Determine the angle of inclination of line segment AC. (5)

2.2 The quadrilateral below has vertices A(4; 4), B(9; 1), C(7; –2) and D(3; 0).



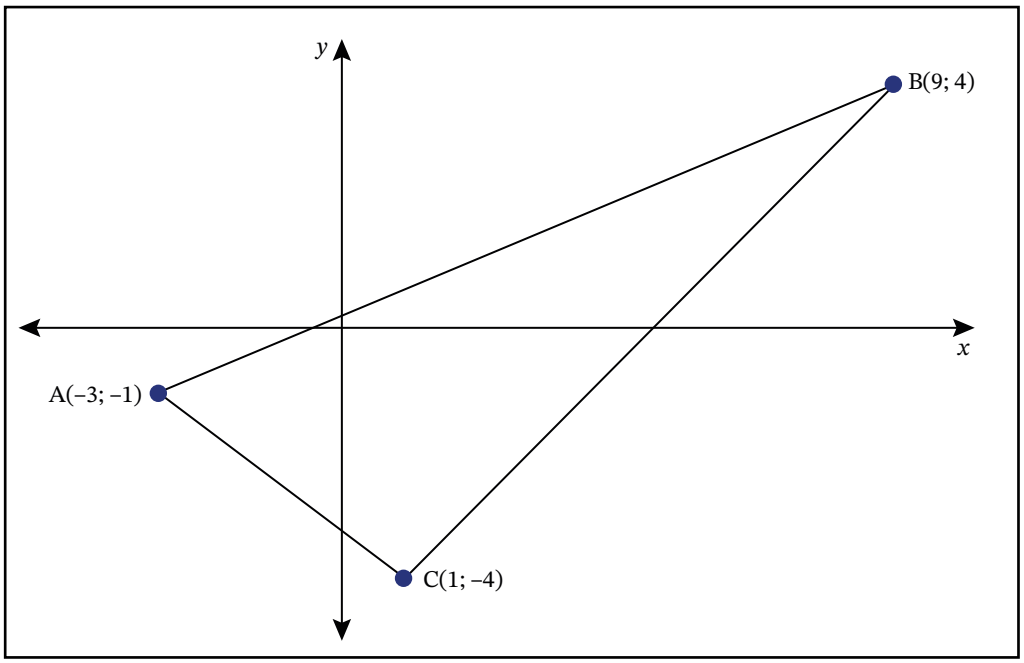
2.2.1 Calculate the distance of line segment AB. (3)

2.2.2 If M is the midpoint of BC, determine the coordinates of M. (2)

2.2.3 Calculate the gradient of line segment CD. (2)

2.2.4 Determine the equation of line BC. (4)

2.3 The figure below shows ΔABC with vertices A(–3; –1); B(9; 4) and C(1; –4).



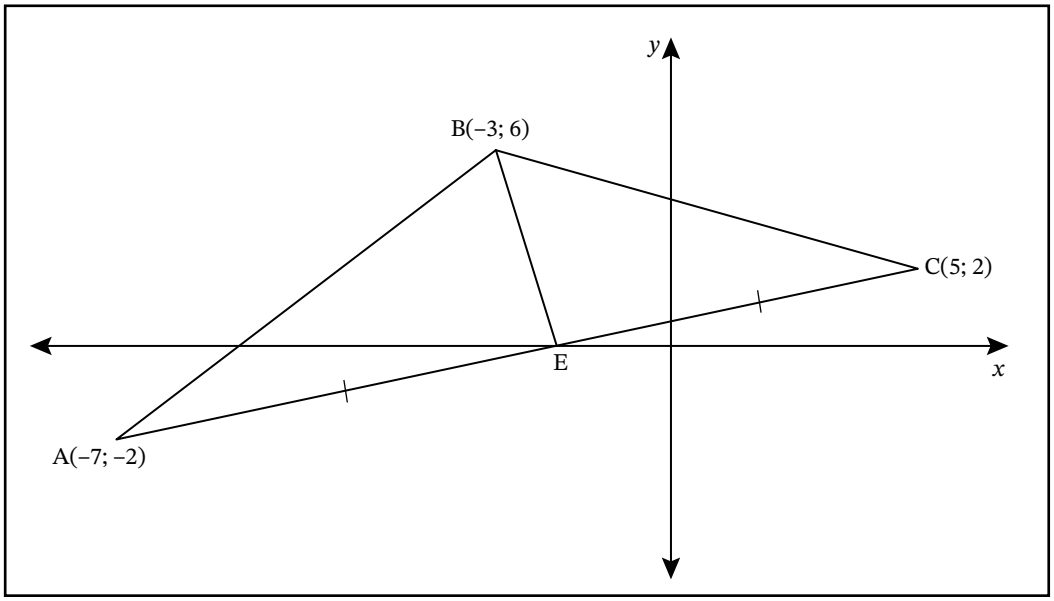
2.3.1 Calculate the length of the line segment AC in surd form. (3)

2.3.2 Determine the gradient of line BC. (2)

2.3.3 Prove that the midpoint of line BC lies on the *x*-axis. (4)

2.3.4 Determine the equation of the straight line AB. (4)

2.4 The vertices of ΔABC are A(–7; –2); B(–3; 6) and C(5; 2). E is the midpoint of AC.

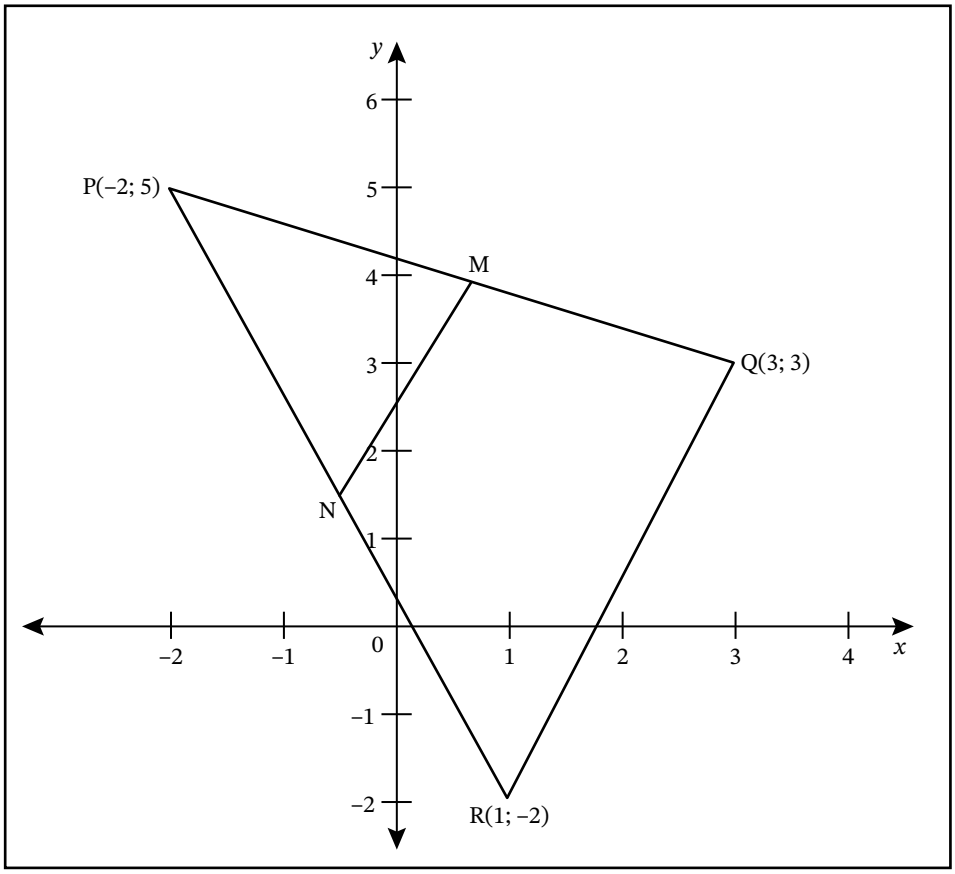


2.4.1 Calculate the coordinates of E. (2)

2.4.2 Calculate the length of line BC. (3)

2.4.3 Determine the gradient of line BC. (3)

2.5 The triangle PQR has the coordinates P(–2; 5); Q(3; 3) and R(1; –2).



2.5.1 Calculate the lengths of PQ, QR and PR.
Answers may be left in surd form. (6)

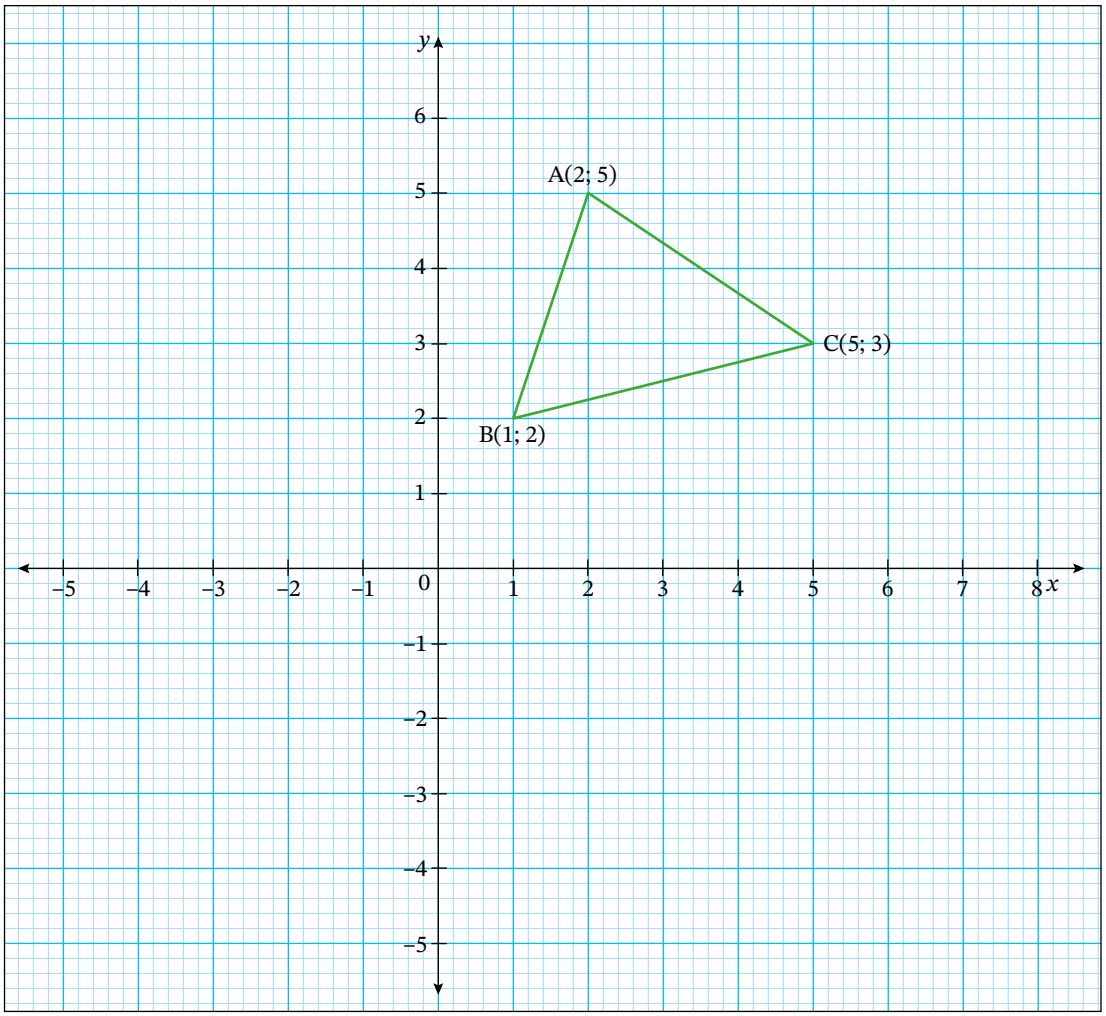
2.5.2 Calculate M and N, which form the midpoints of PQ and PR respectively. (4)

2.5.3 Show that the gradients of MN and QR are equal. (4)

2.5.4 Calculate the area of the triangle if PQR is a right-angled triangle. (2)

QUESTION 3: Translations and reflections

3.1 A triangle with vertices A(2; 5), B(1; 2) and C(5; 3) is shown below.

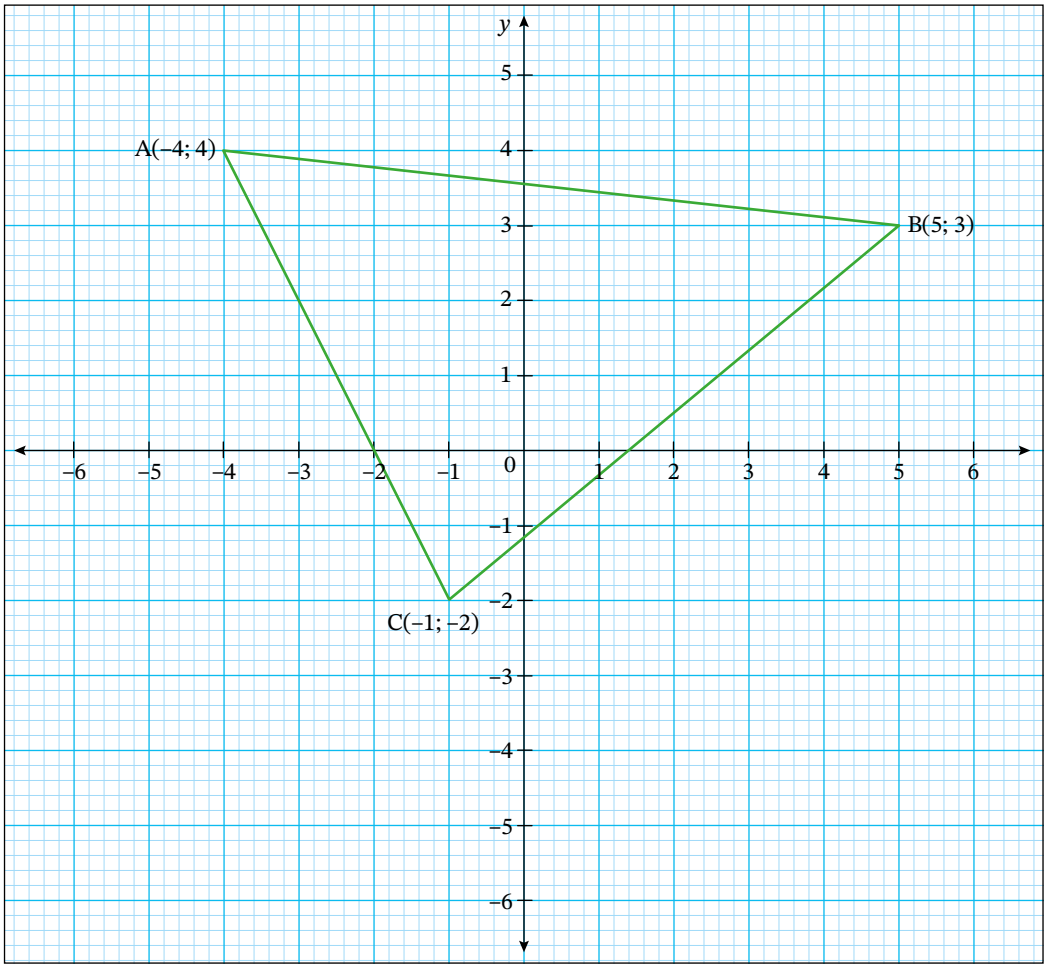


3.1.1 Determine the coordinates of $\hat{B}$ if ΔABC is translated 2 units down and 1 unit to the left. (2)

3.1.2 Determine the coordinates of $\hat{A}$ if ΔABC is reflected about the *y*-axis. (2)

3.1.3 Determine the coordinates of $\hat{C}$ if ΔABC is reflected about the *x*-axis. (2)

3.2 Given below is a triangle with vertices A(–4; 4), B(5; 3) and C(–1; –2).

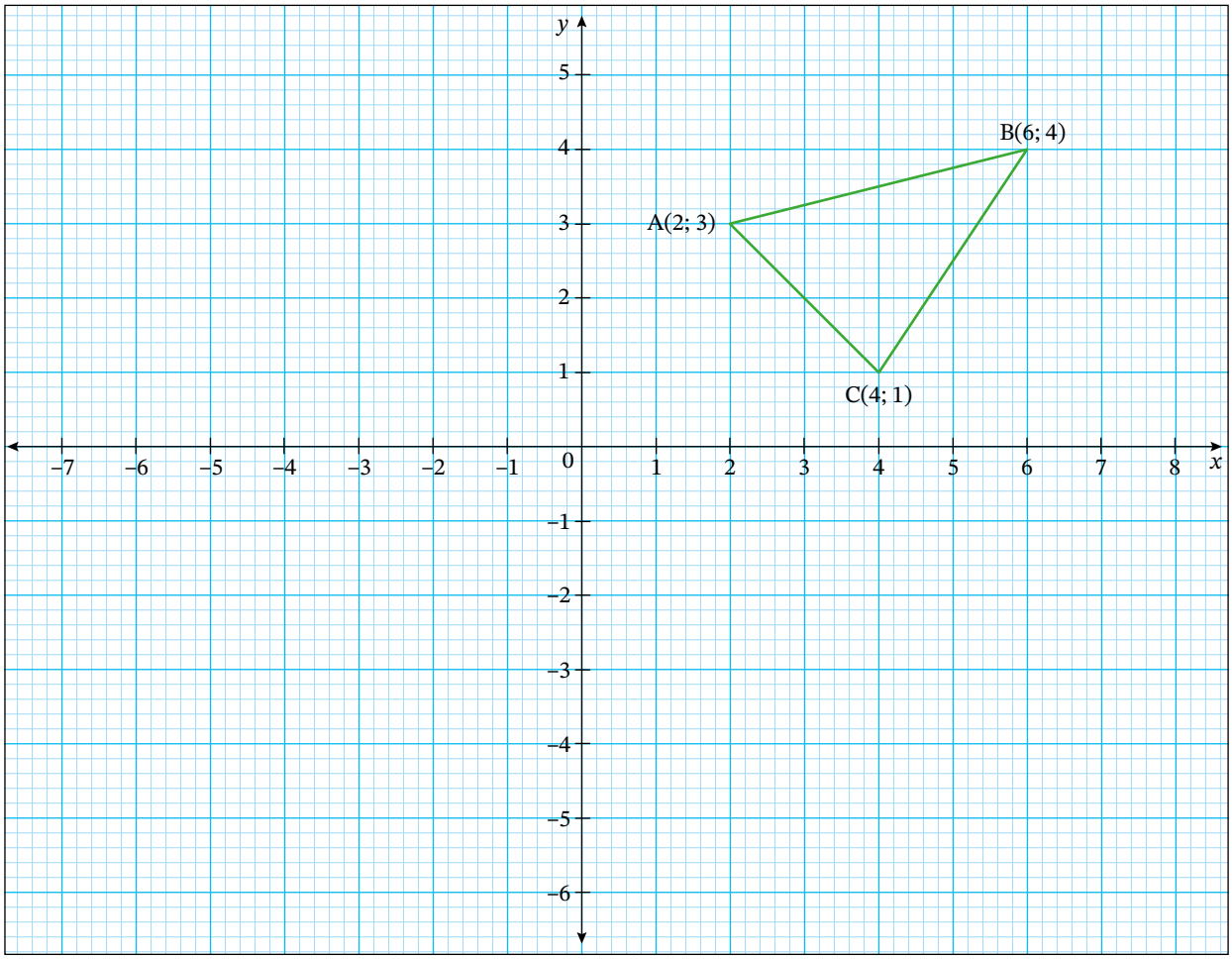


3.2.1 Determine the coordinates of point C if the point moves 3 units to the left and 2 units down.

3.2.2 Determine the coordinates of point B if the point is reflected about the *x*-axis.

3.2.3 Determine the coordinates of point A if the point is reflected about the line $y = x$. (3 × 2) (6)

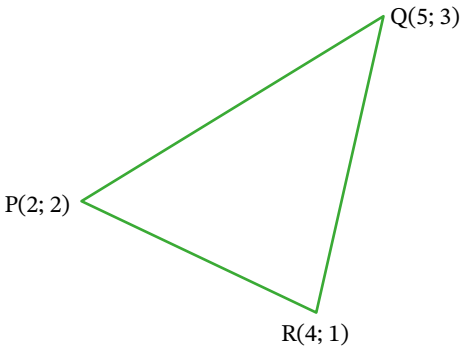
3.3 Given ΔABC with vertices A(2; 3), B(6; 4) and C(4; 1).



3.3.1 Write down the coordinates of points A, B and C if the points are translated two units right and three units down. (3)

3.3.2 Determine the coordinates of point A if it is reflected about the line $y = -x$. (1)

3.4 Given ΔPQR with vertices P(2; 2), Q(5; 3) and R(4; 1).



3.4.1 Translate points P, Q and R by 1 unit right and 4 units down. (6)

3.4.2 Determine point P if it is reflected about $y = -x$. (2)

3.4.3 Determine the coordinates of point Q if it is reflected about $y = x$. (2)

3.5 Describe the following transformations:

3.5.1 $A(7; -5) \rightarrow A'(9; 0)$ (2)

3.5.2 $B(-4; 6) \rightarrow B'(4; 6)$ (1)

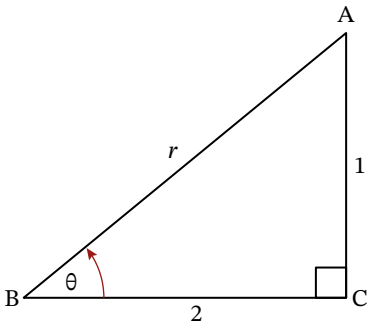
3.5.3 $C(-3; -2) \rightarrow C'(-2; -3)$ (1)

3.5.4 $D(8; 1) \rightarrow D'(8; -1)$ (1)

Part B: Trigonometry

QUESTION 1: Use trig functions to solve problems (Theorem of Pythagoras)

1.1 Consider the following diagram. In ΔABC, AB = *r*, AC = 1 and BC = 2.



Determine the values of the following:

1.1.1 $\sin\theta - \cot\theta$ (3)

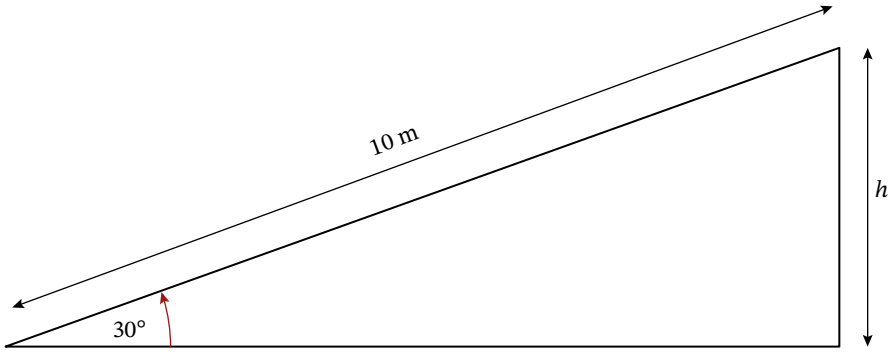
1.1.2 $3\cos^2\theta + \text{cosec}\,\theta$ (3)

1.2 Use a calculator to simplify the following:

1.2.1 $\cos^2 30° + \sqrt{\tan 45°} + \sin(60° + 30°)$ (3)

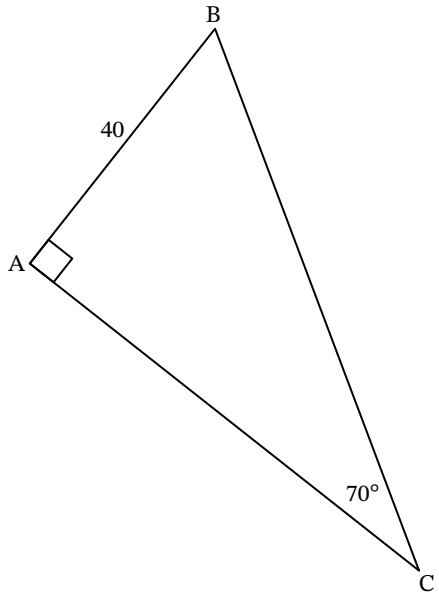
1.2.2 $\sin 45° \div \cos 45°$ (3)

1.3 If an inclined plane has a length of 10 meters and an angle of 30 degrees as shown below:



Calculate the unknown height (*h*) in the figure given. (3)

1.4 Given below is triangle ABC with AB = 40 units, $B\hat{A}C = 90°$ and $A\hat{C}B = 70°$.



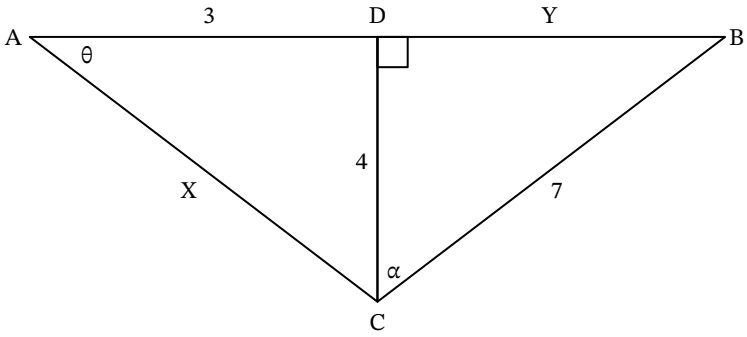
Calculate:

1.4.1 BC

1.4.2 $1 - \sin^2 70°$

1.4.3 $\tan 70°$ (3 × 3) (9)

1.5 The following diagram shows ΔABC.

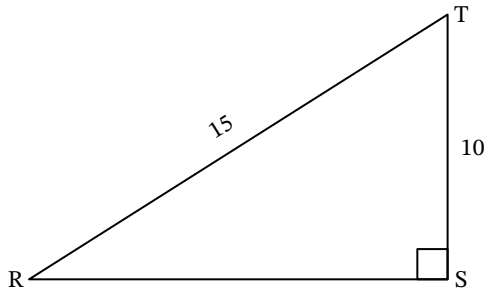


1.5.1 Calculate the value of θ in degrees. (3)

1.5.2 Determine the value of DB. Leave the answer in surd form. (2)

1.5.3 Calculate the value of θ in degrees. (3)

1.6 In triangle RST, RT = 5 units; TS = 10 units; angle S = 90°



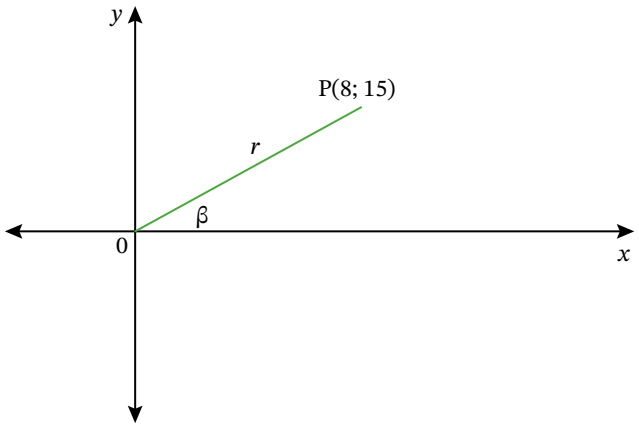
1.6.1 What is the name given to the longest side of the right-angled triangle (RT)? (1)

1.6.2 Write down $\hat{T}$ as a ratio in its lowest form. (2)

1.6.3 Calculate $\hat{T}$. (2)

1.6.4 Calculate the length of RS. (3)

1.7 Below is a diagram of a Cartesian plane with coordinates P(8; 15).



1.7.1 Calculate the distance (*r*) OP.

Determine each of the following values:

1.7.2 cos β + sin β

1.7.3 tan β × cos β (3 × 2) (6)

1.8 If A = 75° and B = 15°, calculate each of the following using a calculator:

1.8.1 cos (A – B)

1.8.2 sin (A + B) + $\cos^2 0°$ – tan 45° (2 × 2) (4)

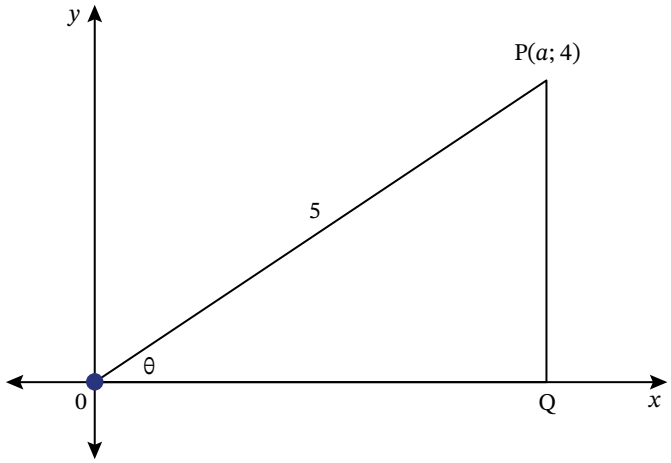
QUESTION 2: Trig ratios in quadrants

2.1 Solve for θ, where θ ≤ 90°.

2.1.1 $\tan\theta = \sin 90°$ (3)

2.1.2 $\frac{2}{\text{cosec}\,\theta} - 1 = 0$ (3)

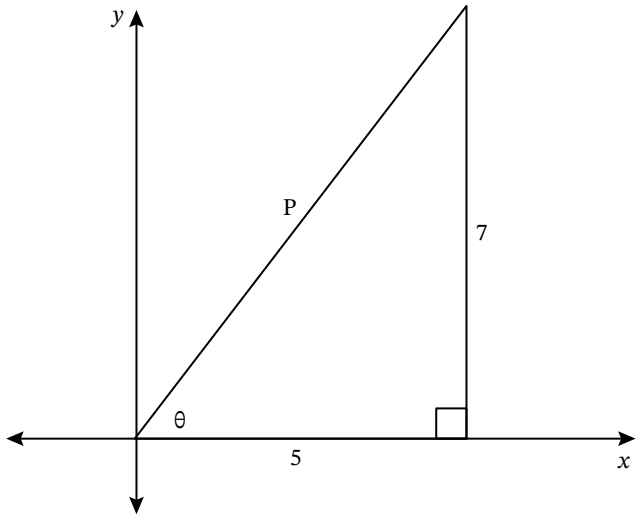
2.2 In the diagram below, O is the origin, OP is 5 units and the coordinates of point P is $(a; 4)$.



2.2.1 Calculate the value of a. (3)

2.2.2 Calculate the coordinate of Q. (2)

2.3 Given $\tan\theta = \frac{7}{5}$ and $0 \leq \theta \leq 90°$.

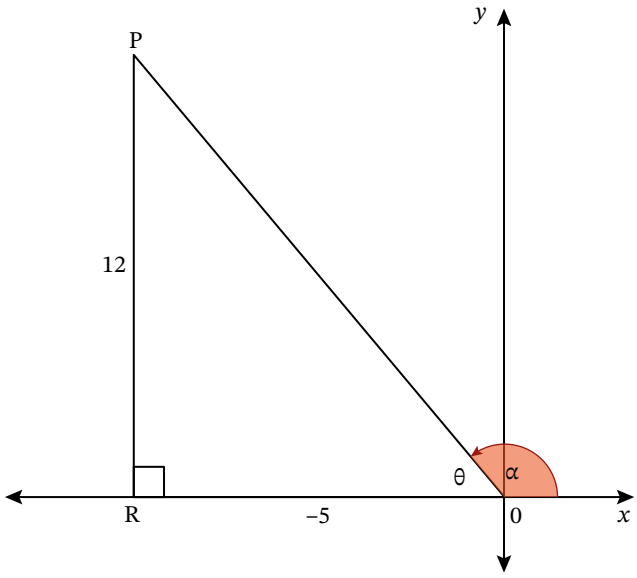


2.3.1 Calculate the value of P. (3)

2.3.2 Calculate the value of $\frac{\cos\theta}{\sin\theta}$. (4)

2.3.3 Calculate the value of θ. (3)

2.4 Given $\tan\theta = \frac{12}{-5}$ and $90° \leq \alpha \leq 180°$.



2.4.1 Calculate the length of PO. (3)

2.4.2 Calculate the value of $\sin\alpha + \cos\alpha$. (3)

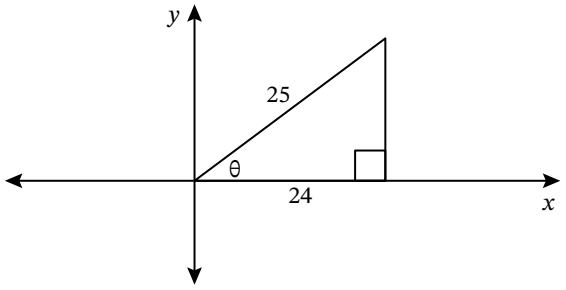
2.4.3 Calculate the value of α. (3)

2.5 If $\sqrt{3}\tan\alpha - 1 = 0$ and $0° \leq \alpha \leq 90°$, calculate the value of each of the following:

2.5.1 $\cos\alpha$ (3)

2.5.2 $1 + 3\tan^2\alpha$ (2)

2.6 If $\cos\theta = \frac{24}{25}$, $0° \leq \theta \leq 90°$, determine the following:



2.6.1 $\sin\theta$ (3)

2.6.2 $5\cos\theta - 12\tan\theta$ (3)

2.7 Solve for α in each of the following using a calculator.
Give the answer to one decimal.

2.7.1 $\cos(\alpha - 20°) = \frac{\sqrt{3}}{2}$

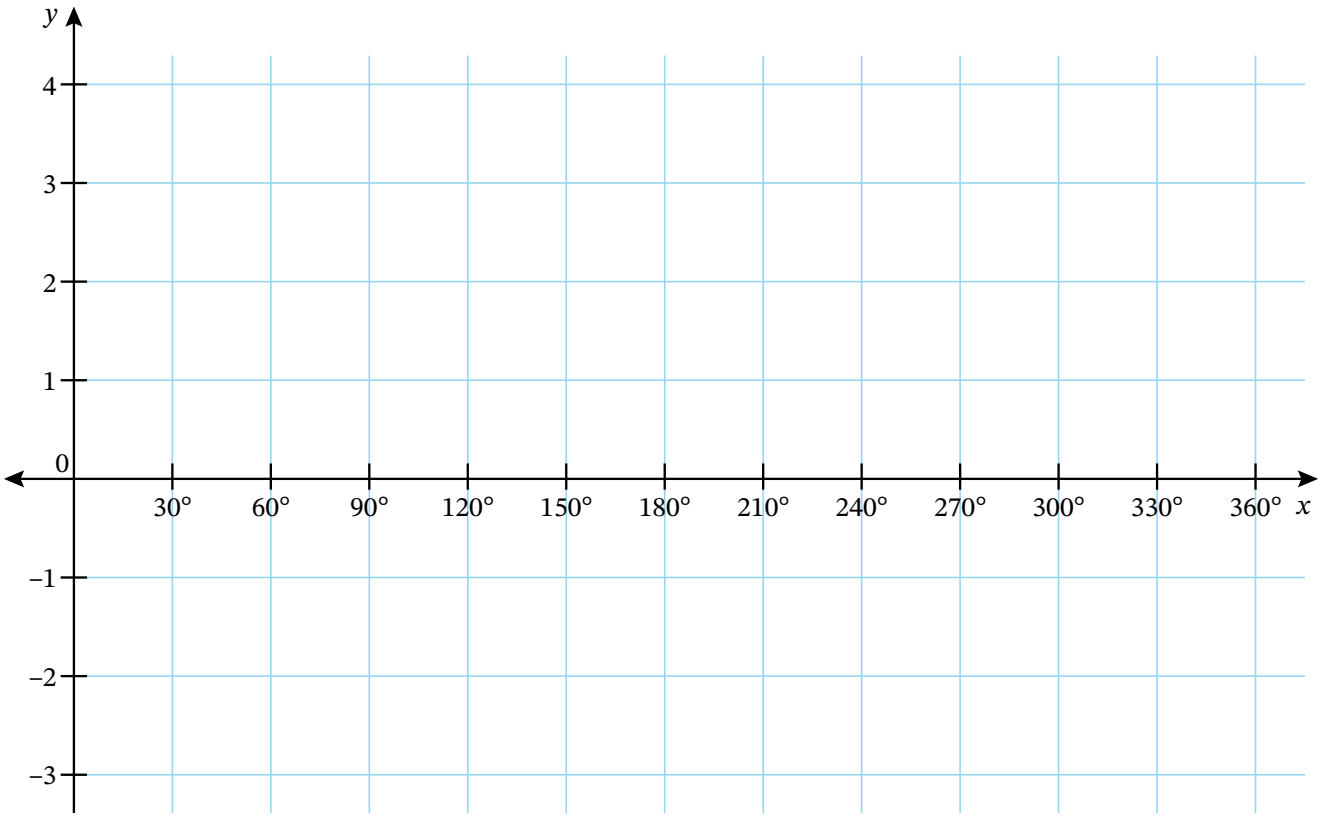
2.7.2 $\sin\alpha = 0{,}468$ (2 × 2) (4)

QUESTION 3: Trig graphs

3.1 Given $f(x) = 2\cos x$ and $g(x) = \sin x + 1$ where $0° \leq x \leq 360°$.

3.1.1 On the diagram below, sketch $f(x)$ and $g(x)$ on the same set of axes. Start by completing the table of values for $f(x)$ and $g(x)$ to help you draw the graphs. (6)

x	0°	30°	60°	90°	120°	150°	180°	210°	240°	270°	300°	330°	360°
$f(x)$													
$g(x)$													



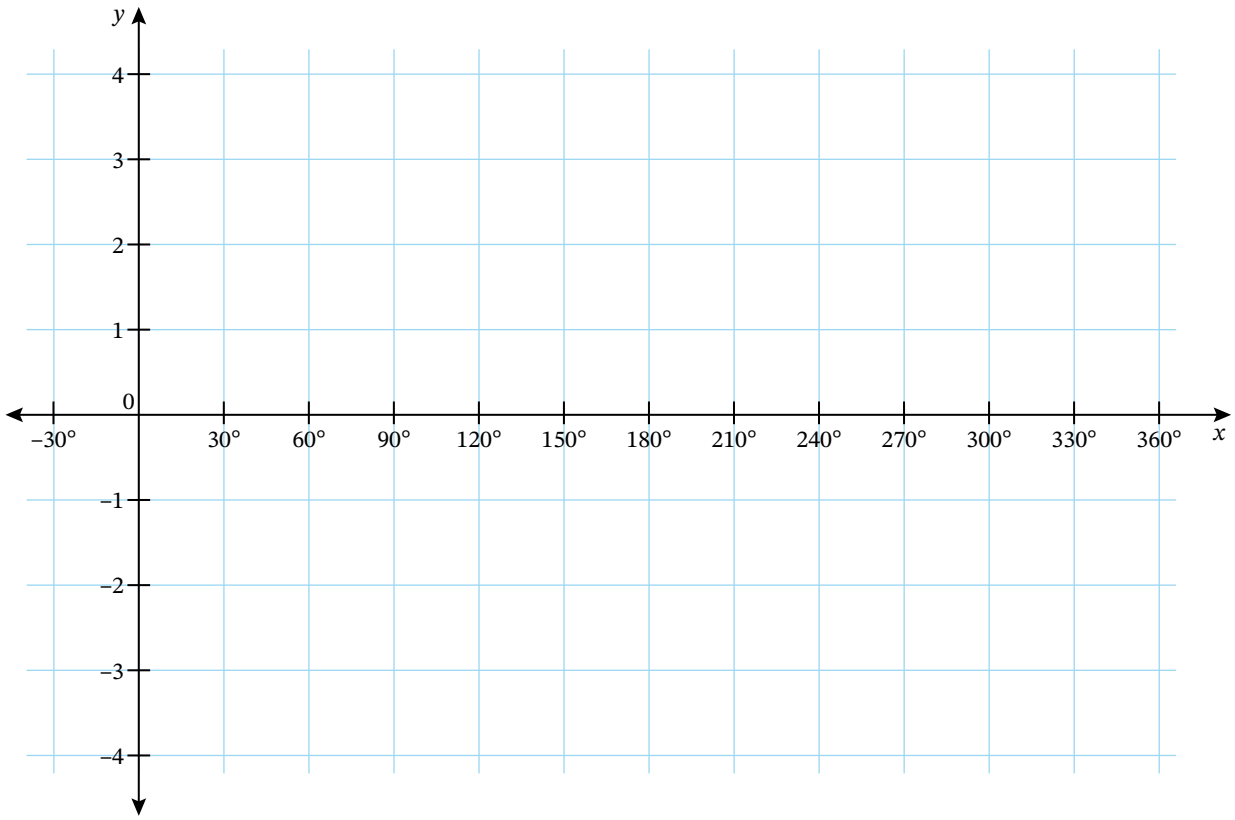
3.1.2 What is the amplitude of (x)? (1)

3.1.3 What is the period of (x)? (1)

3.1.4 What is the range and domain of $g(x)$? (2)

3.2 3.2.1 Draw the graph of $f(x) = 2 \sin x - 1$ and $g(x) = -3 \cos x$ on the same system of axes where $0° \leq x \leq 360°$ on the diagram below. (6)

x	0°	30°	60°	90°	120°	150°	180°	210°	240°	270°	300°	330°	360°
$f(x) = 2 \sin x - 1$													
$g(x) = -3 \cos x$													



3.2.2 Determine the domain of $g(x) = -3 \cos x$. (2)

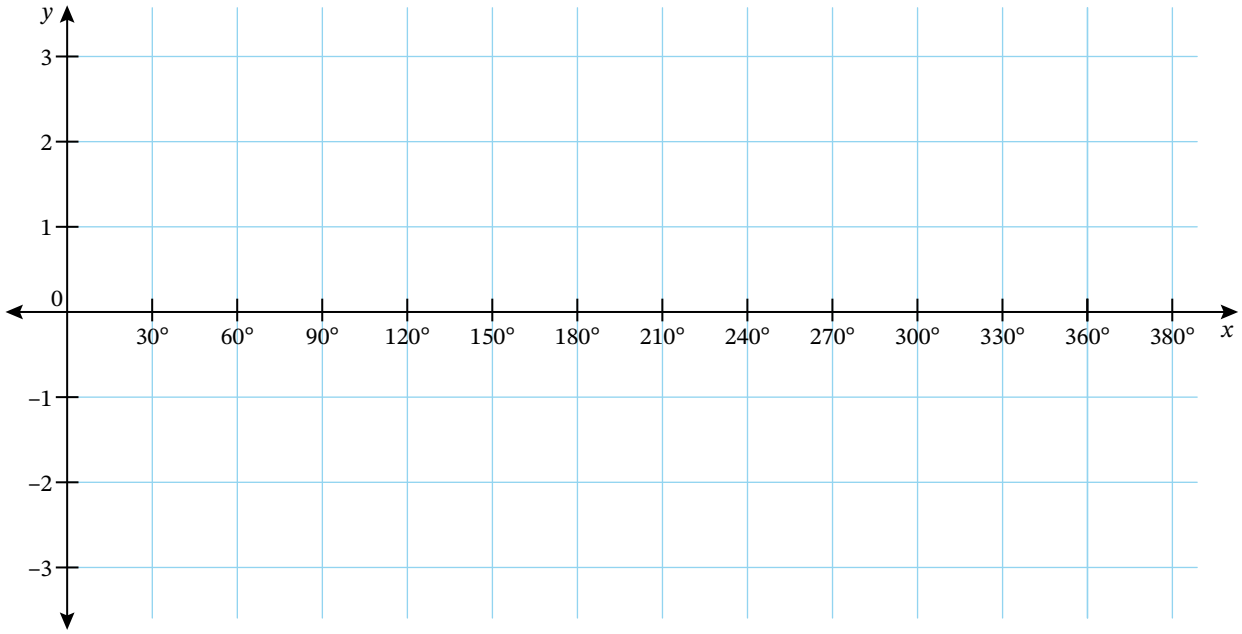
3.2.3 Determine the range of $g(x) = -3 \cos x$. (2)

3.2.4 Determine the amplitude$f(x) = 2 \sin x - 1$. (1)

3.2.5 Determine the period of $f(x) = 2 \sin x - 1$. (1)

3.3 3.3.1 Draw the graph of $f(x) = 2 \sin x$ and $g(x) = 2 \sin x - 1$ on the same system of axes where $0° \leq x \leq 360°$ on the diagram below.
Complete the table for the values of $f(x)$ and $g(x)$. (6)

x	0°	30°	60°	90°	120°	150°	180°	210°	240°	270°	300°	330°	360°
$f(x) = 2 \sin x$													
$g(x) = 2 \sin x - 1$													



3.3.2 What is the amplitude of $f(x)$? (2)

3.3.3 What is the amplitude of $g(x)$? (2)

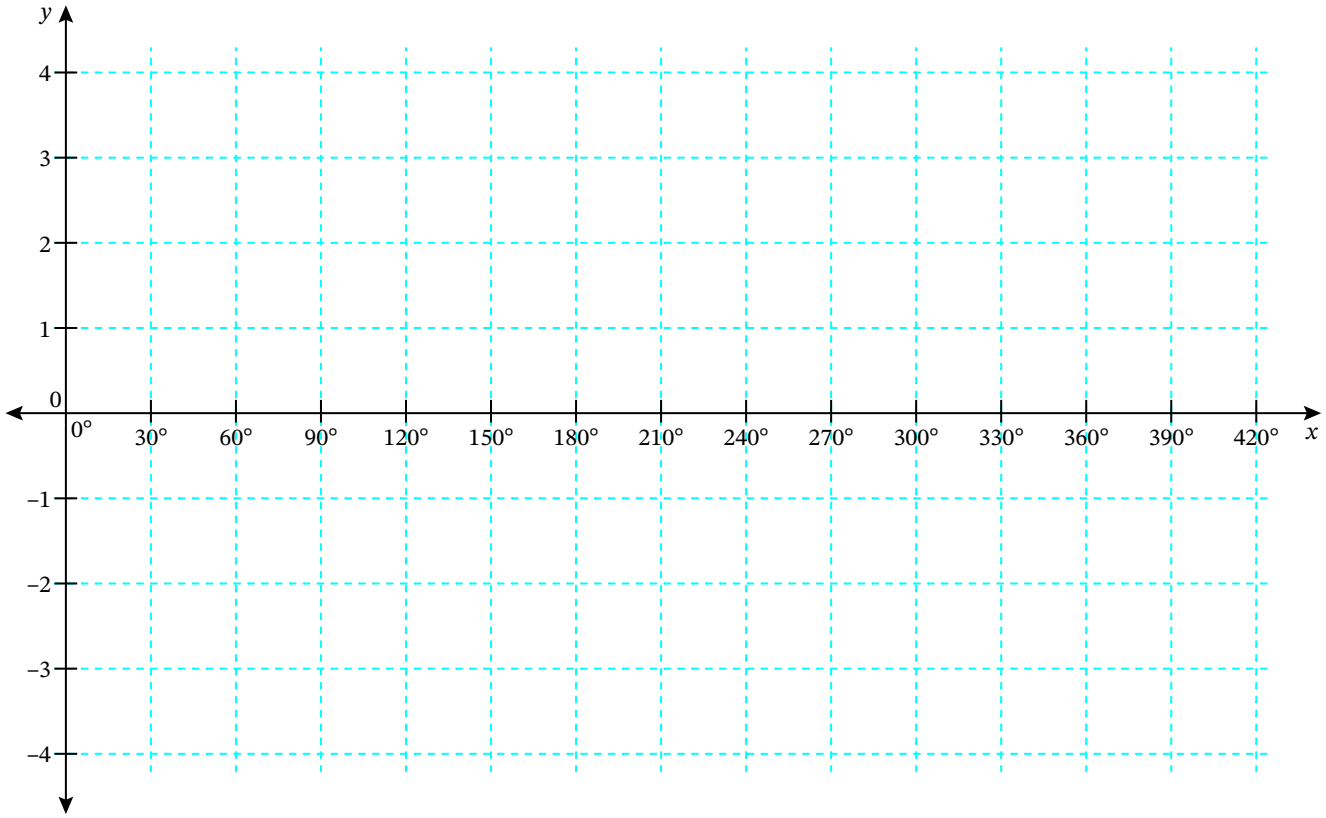
3.3.4 What is the range and domain of $g(x)$? (2)

3.3.5 What is the period of $f(x) = 2 \sin x$? (2)

3.3.6 Is there any point of intersection of the graphs $f(x)$ and $g(x)$?
If so, give the point of intersection. (1)

3.4 3.4.1 Draw the graph of $f(x) = \cos x$ and $g(x) = 2 \sin x$ on the same system of axes where $0° \leq x \leq 360°$ on the diagram below. It is optional for you to use the table to determine values for $f(x)$ and $g(x)$ to help you draw the graph. (6)

x	0°	30°	60°	90°	120°	150°	180°	210°	240°	270°	300°	330°	360°
$f(x) = \cos x$													
$g(x) = 2 \sin x$													



3.4.2 What is the period of $f(x) = \cos x$? (1)

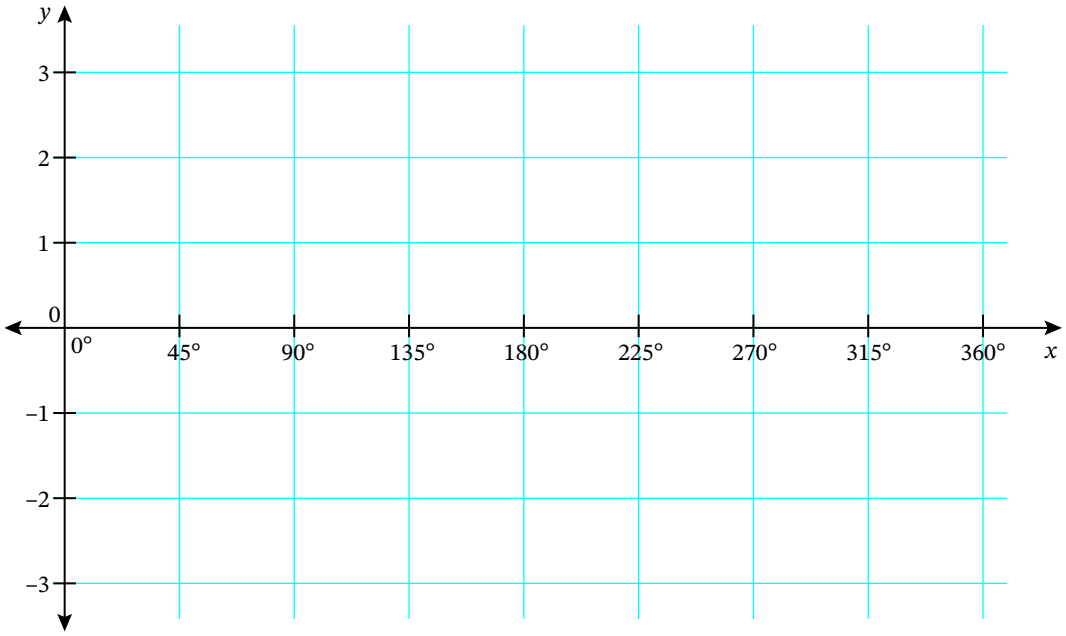
3.4.3 What is the range of $g(x) = \cos x$? (1)

3.5 Given $f(x) = 2 \sin x$ and $g(x) = \cos x + 1$ and $0° \leq x \leq 36°$.

3.5.1 Write down the range of $f(x)$. (2)

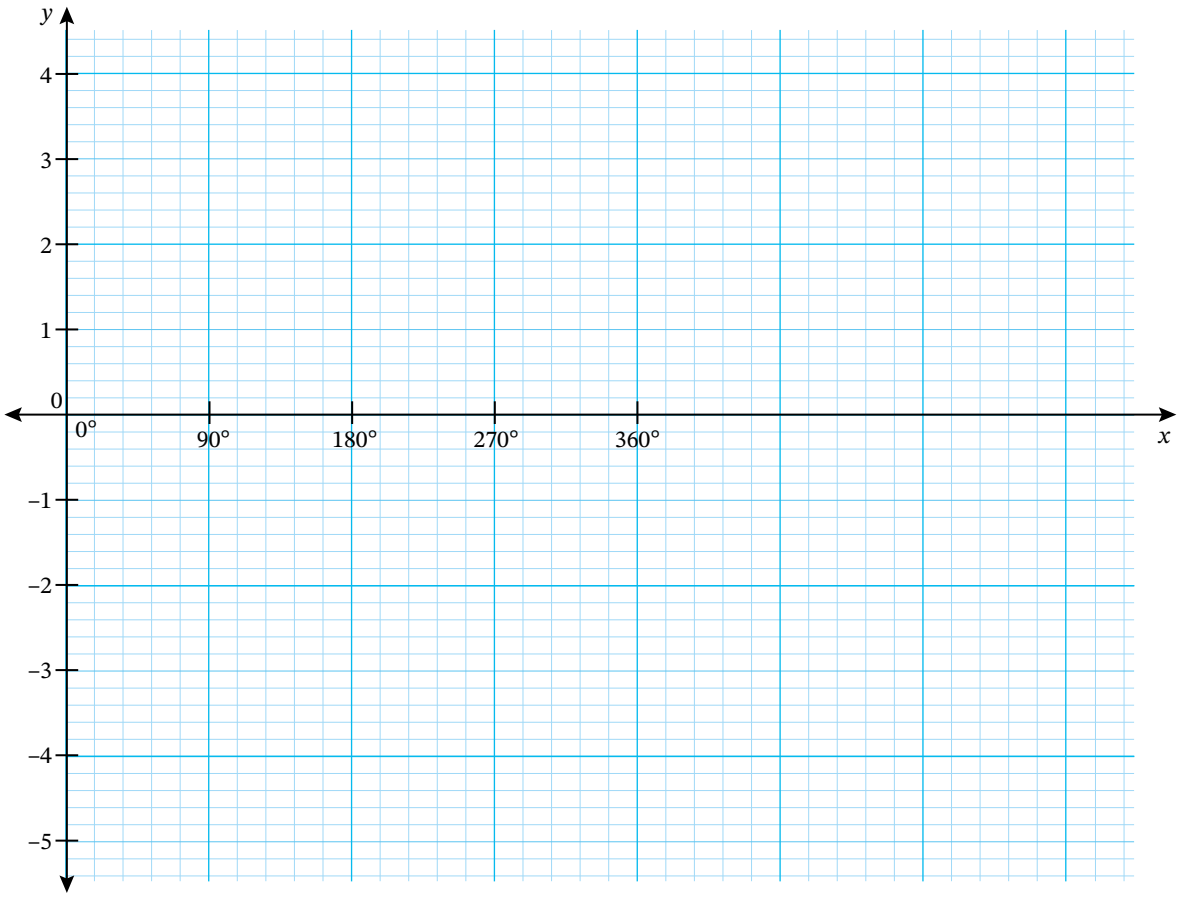
3.5.2 Sketch $f(x)$ and $g(x)$ on the same system of axes on the graph provided in the diagram below, using the table provided to first tabulate the values. (8)

x	0°	45°	90°	135°	180°	225°	270°	315°	360°
$f(x) = 2 \sin x$						–1,4			
$g(g) = \cos x + 1$						0,3			



3.6 Use the table and grid below and draw the graph $f(x) = -2\cos x + 1$ (3)

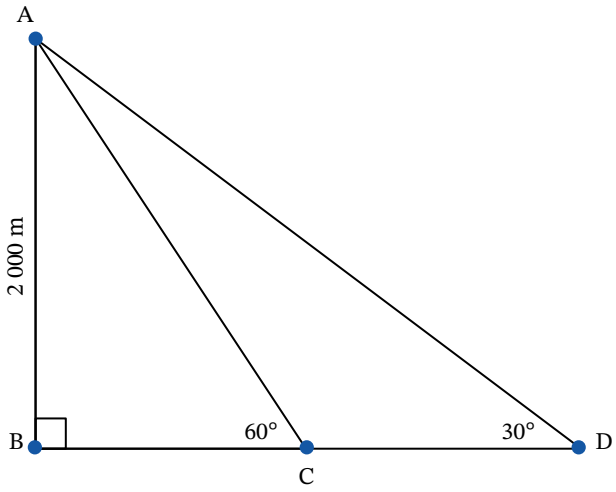
x	0°	90°	180°	270°	360°
$f(x) = -2\cos x + 1$					



(3)

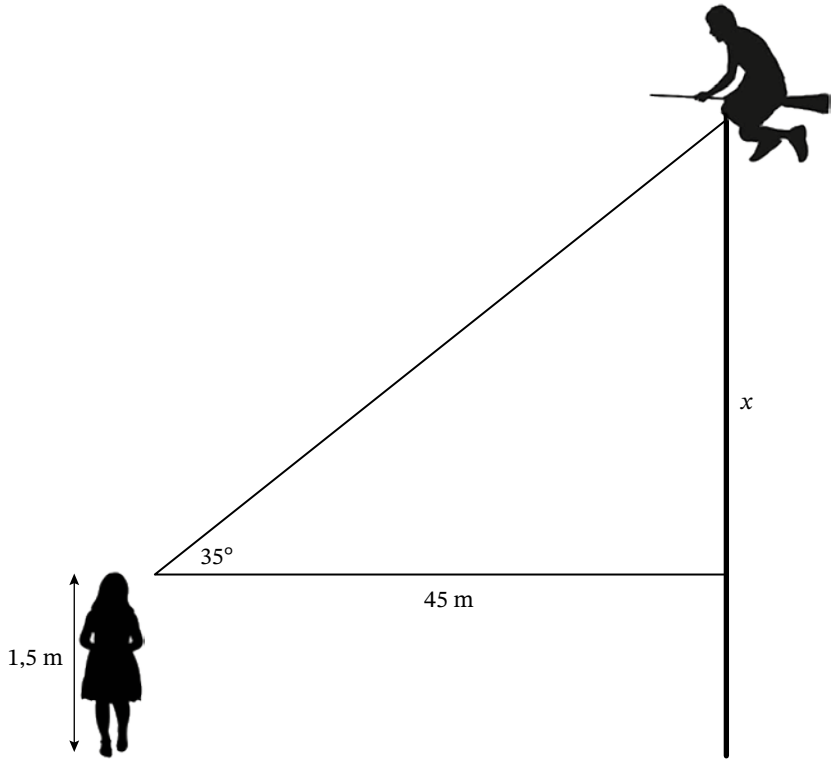
QUESTION 4: Problems in two dimensions (angles of elevation and depression)

4.1 An aeroplane at an altitude of 2 000 m (point A) finds that two boats at points C and D sailing in the same direction. The angles of elevation from the boats to the aeroplane are 60° and 30° respectively.



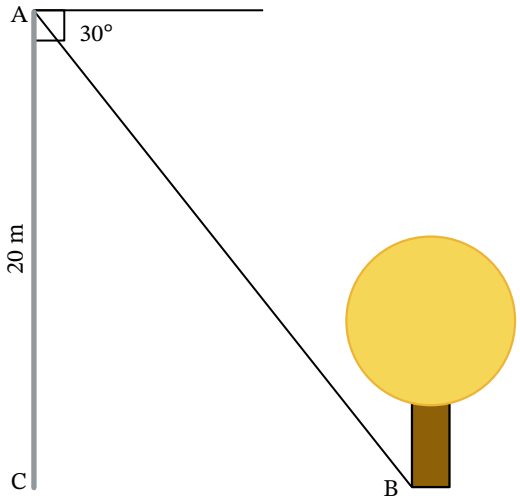
Calculate the distance between the two boats (CD). (4)

4.2 During a local event at Pogwarts, Lermione, on the ground is looking at Larry who is at the top of the pole. Lermione is 1,5 m tall and the angle of elevation from her line of sight to the top of the pole is 35°. She is standing 45 m away from the base of the pole.



Calculate the height of the pole (x). (5)

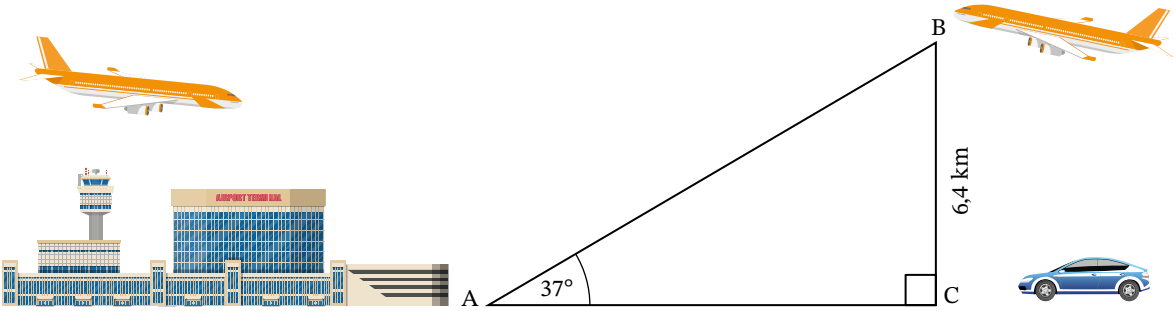
4.3 John was repairing a cable post with a height of 20 m from the top of the post. He noticed a gate light at a certain distance at an angle of depression 30°.



4.3.1 Calculate the distance BC. (3)

4.3.2 Calculate the distance between point A and point B. (2)

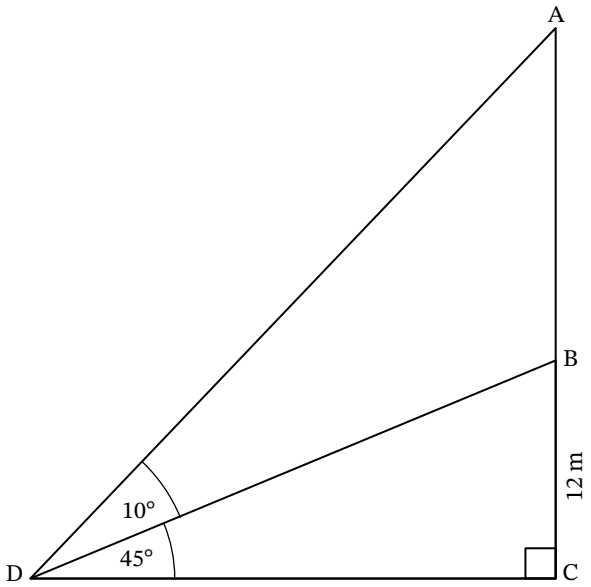
4.4 At a moment in time, a plane in flight is 6,4 km above the ground at point B. The angle of elevation from the airport at point A to the plane at point B is 37°. A car at point C is directly below the plane.



4.4.1 Calculate the distance AB that the plane is from the airport. (3)

4.4.2 Calculate the distance AC that the car is from the airport. (3)

4.5 In ΔADC below, $\hat{C} = 90°$, $A\hat{D}B = 10°$, $B\hat{D}C = 45°$ and BC = 12 m.



4.5.1 Determine $A\hat{D}C$. (1)

Calculate the length of each of the following sides:

4.5.2 DC (3)

4.5.3 AC (2)

4.5.4 AB (2)

Question papers Maths L2

Introduction to Paper 1 and Paper 2

Proposed mark distribution between Paper 1 and Paper 2 for external examination papers

Paper 1	
Topics	**Marks**
1. Numbers	30
2. Functions and Algebra	
2.1 Functions	25
2.2 Algebra	25
5. Financial Mathematics	20
Total	**100**

Paper 2	
Topics	**Marks**
3. Space, Shape and Measurement	
3.1 Geometry	30
3.2 Trigonometry	30
4. Data Handling	40
Total	**100**

Formula sheets

- Paper 1
- Paper 2
- Chapter 4: Data Handling (Paper 2)

Chapter 4: **Data Handling** (Paper 2)

QUESTION 1: Central tendencies and data dispersion

1.1 Define the following terms:

1.1.1 Mean

1.1.2 Median (2 × 2) (4)

1.2 Use the data below to answer the questions that follow:

27	33	32	17	27	48	67	24	35

1.2.1 Determine the lower quartile. (2)

1.2.2 Determine the upper quartile. (2)

1.2.3 Determine the interquartile range (2)

1.2.4 Determine the semi-interquartile range. (1)

1.2.5 Determine the 75th percentile of the data. (3)

1.3 Define each of the following terms used in data handling:

1.3.1 Sample size

1.3.2 Modal value (2 × 2) (4)

1.4 A large company in a city started a fitness campaign at the workplace. They weighed each person and recorded their masses. The following are the masses of the 12 employees in kilograms:

81	77	67	75	88	80
71	66	65	72	74	66

1.4.1 Determine the lower quartile. (2)

1.4.2 Determine the upper quartile. (2)

1.4.3 Determine the interquartile range. (2)

1.4.4 Determine the range of the data. (1)

1.4.5 Determine the 68th percentile of the data. (3)

1.5 Define each of the following terms used in data handling:

1.5.1 Discrete data

1.5.2 Mean (2 × 2) (4)

1.6 The following table shows the number of cool drink bottles sold for 12 days in a shop:

35	14	12	17	22	33
48	32	25	30	29	30

1.6.1 Find the range of the data. (1)

1.6.2 Determine the lower quartile. (2)

1.6.3 Determine the upper quartile. (2)

1.6.4 Determine the interquartile range. (2)

1.6.5 Determine the semi-interquartile range. (1)

1.6.6 Determine the 67th percentile of the data. (3)

1.7 Define each of the following terms used in data handling:

1.7.1 Raw data

1.7.2 Frequency (2 × 2) (4)

1.8 The following table shows the number of hours that 11 nurses worked giving Covid-19 vaccinations:

35	50	61	59	44	48	38	47	30	39	56

1.8.1 Find the range of the data. (1)

1.8.2 Determine the lower quartile. (2)

1.8.3 Determine the upper quartile. (2)

1.8.4 Determine the interquartile range. (2)

1.8.5 Determine the semi-interquartile range. (1)

1.8.6 Determine the 37th percentile of the data. (3)

1.9 Define the following terminology used in data handling:

1.9.1 Range (2)

1.9.2 Raw data (2)

1.10 The ages of people attending a gymnasium to stay fit are represented as follows:

34; 35; 18; 29; 32; 42; 25; 23; 25; 32; 19; 55; 33; 54; 34; 40; 25; 37; 36; 20

1.10.1 Construct a stem-and-leaf diagram. (5)

1.10.2 Determine the median. (2)

1.10.3 Calculate the mean. (2)

1.10.4 Write down the mode. (1)

1.11 The points scored by a basketball player are represented as follows:

33; 11; 26; 3; 42; 49; 35; 11; 49; 42; 10; 3; 2; 47; 32; 29; 6; 18

1.11.1 Find the range. (2)

1.11.2 Arrange the points in ascending order. (1)

1.11.3 Determine the lower quartile. (2)

1.11.4 Determine the upper quartile. (2)

1.11.5 Find the interquartile range. (2)

1.11.6 Determine the semi-interquartile range. (2)

1.11.7 Determine the 40th percentile. (3)

1.12 The shirts of the boys in Grade 9B of a certain school are the following sizes:

28; 27; 32; 31; 33; 29; 28; 31; 28; 28; 29; 28; 28;
31; 32; 28; 29; 28; 30; 31; 28; 30; 29; 28; 32; 28

1.12.1 How many boys are in Grade 9B? (1)

1.12.2 Calculate the mean of the sizes. (2)

1.12.3 Arrange the sizes in ascending order. (2)

1.12.4 Determine the median of the sizes. (2)

1.12.5 Write down the mode of the sizes. (1)

1.13 A researcher analyses data about the people suffering from type A flu virus. The ages are as follows:

60; 80; 75; 87; 88; 49; 94; 84; 59; 43; 56; 86; 82; 62; 51; 79; 89; 78

1.13.1 Construct a stem-and-leaf diagram. (7)

1.13.2 Write down the minimum age and the maximum age. (2)

1.13.3 Determine the lower quartile (Q_1). (2)

1.13.4 Calculate the upper quartile (Q_3). (2)

1.13.5 Determine the interquartile range (IQR). (2)

1.13.6 Determine the value for the 70th percentile. (2)

1.13.7 Determine the range. (2)

QUESTION 2: Data representation

2.1 A survey was conducted with 30 boys to determine their favourite sports. The raw data collected from a survey is presented below.

Soccer	Volleyball	Soccer
Tennis	Soccer	Rugby
Soccer	Rugby	Basketball
Volleyball	Soccer	Rugby
Rugby	Tennis	Soccer
Soccer	Basketball	Basketball
Basketball	Soccer	Tennis
Tennis	Rugby	Basketball
Volleyball	Soccer	Soccer
Soccer	Rugby	Soccer

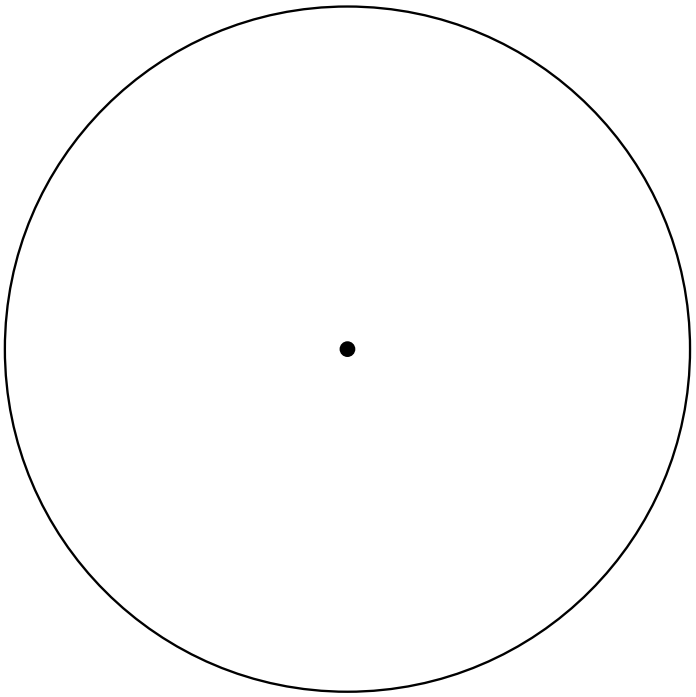
2.1.1 Use the data above to complete the tally and frequency column of the frequency distribution table below.

Frequency distribution table: Choice of sport		
Sport	**Tally**	**Frequency**
Basketball		
Rugby		
Soccer		
Tennis	IIII	4
Volleyball		
	TOTAL:	

(5)

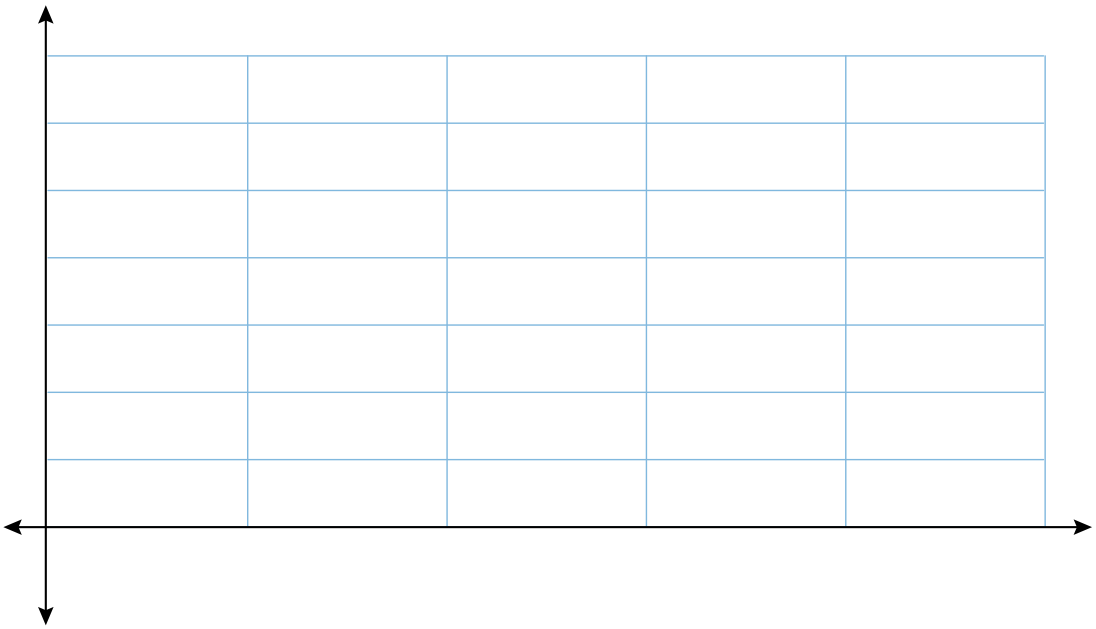
2.1.2 Which sport has the most supporters? (1)

2.1.3 Using the information from Question 2.1.1, construct a pie chart that represents the information on the diagram below.



(5)

2.1.4 Using the information from Question 2.1.1, construct a bar graph that represents the information on the diagram below.



(5)

2.2 Students struggling with mathematics were assigned to twenty lecturers. The number of students that each lecturer is responsible for is listed below.

63	82	74	99
109	95	66	100
95	68	67	79
70	95	95	84
95	91	90	103

2.2.1 Draw a stem-and-leaf plot that represents the information above. (5)

2.2.2 Determine the mode value (mode) for the data set. (2)

2.2.3 Determine the median value for the data set. (2)

2.2.4 Calculate the range for the data set. (1)

2.3 The following are the mathematics marks of 20 NCV Level 2 students in a TVET college:

15	39	50	28	56	34	57	37	30	57
50	57	35	47	57	37	44	55	57	25

2.3.1 Construct a stem-and-leaf diagram. (5)

2.3.2 Determine the mean of the given data. (2)

2.3.3 Determine the median value of the given data. (2)

2.3.4 Write down the modal value of the given data. (2)

2.4 The following data shows the different types of sports the students in a TVET college support:

2.4.1 Write down the modal value of the given data.

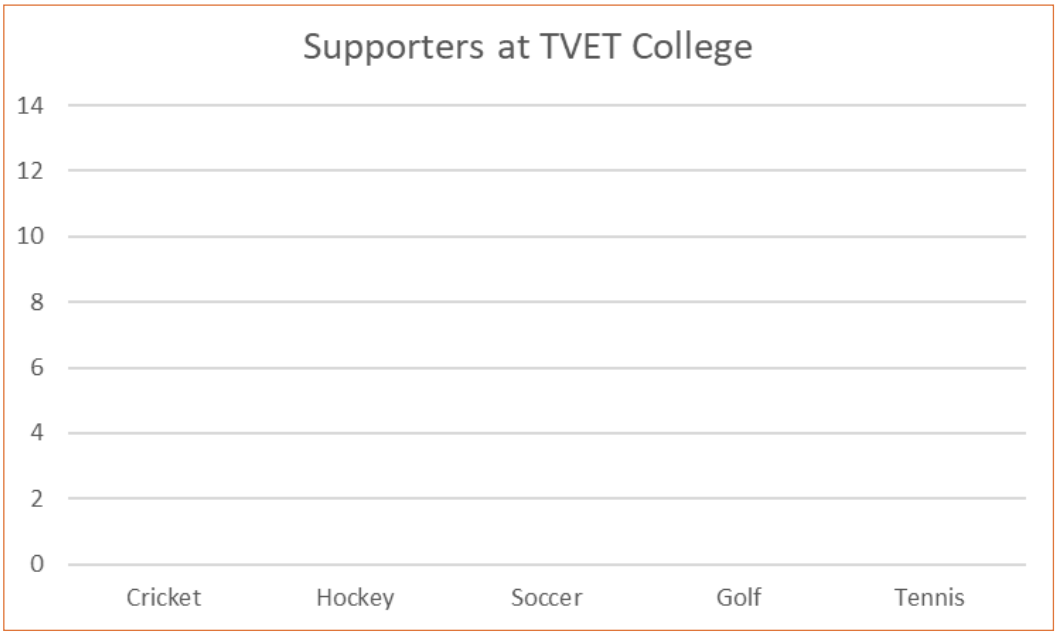
Cricket	Tennis	Tennis	Golf
Cricket	Hockey	Hockey	Tennis
Soccer	Cricket	Soccer	Tennis
Soccer	Golf	Tennis	Hockey
Hockey	Soccer	Hockey	Soccer
Hockey	Cricket	Soccer	Hockey
Golf	Hockey	Golf	Hockey
Soccer	Cricket	Tennis	Soccer
Golf	Tennis	Cricket	Tennis
Soccer	Soccer	Soccer	Soccer

Use the given data to complete the tally and frequency table.

Sports	Tally	Frequency
	TOTAL:	

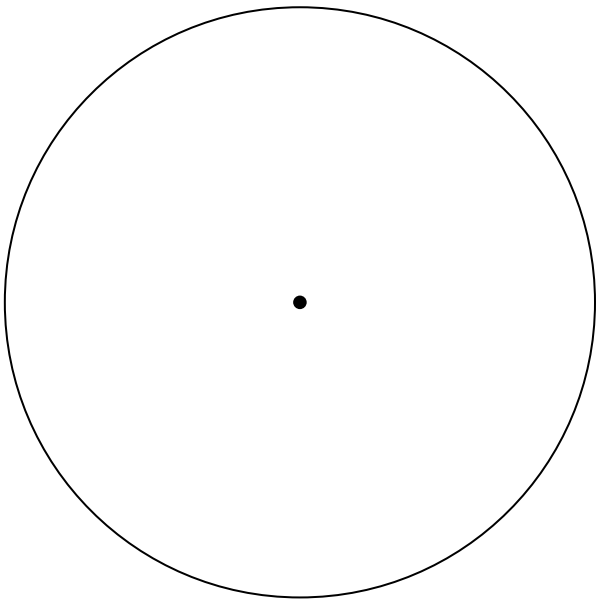
(5)

2.4.2 Draw a bar graph on the diagram below using the given information.



(5)

2.4.3 Use the frequency table to construct a pie chart as degrees on the diagram below. Show all calculations.



(5)

2.5 The following marks were obtained by Masonry NCV Level 2 students at a TVET college:

95	50	97	57	98	59	85	69	70	99
63	86	70	93	65	92	77	74	70	57

2.5.1 Construct a stem-and-leaf diagram for the given data. (5)

2.5.2 Determine the mean of the data. (2)

2.5.3 Determine the median of the data. (2)

2.5.4 Write down the mode of the data. (1)

2.6 The following data shows the different types of car registrations done in a traffic office for a certain day:

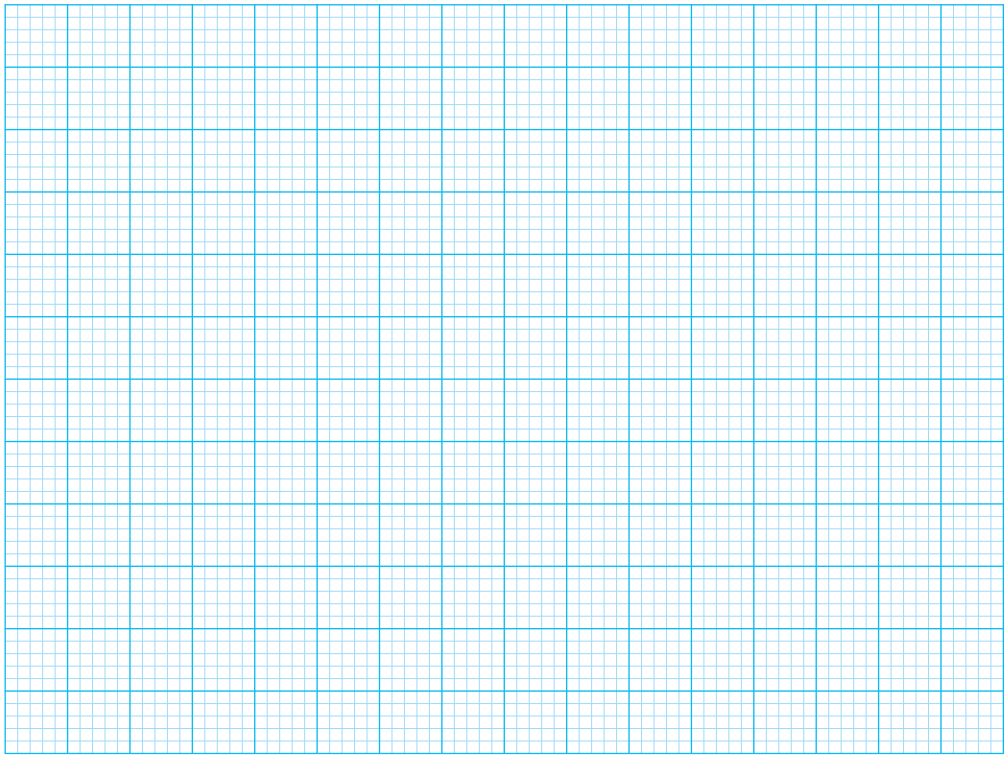
BMW	HYUNDAI	TOYOTA	BMW
HYUNDAI	BMW	KIA	KIA
HYUNDAI	NISSAN	BMW	KIA
TOYOTA	BMW	HYUNDAI	BMW
KIA	HYUNDAI	NISSAN	KIA
BMW	NISSAN	HYUNDAI	BMW
HYUNDAI	KIA	KIA	TOYOTA
NISSAN	BMW	NISSAN	KIA
KIA	TOYOTA	TOYOTA	BMW
BMW	BMW	HYUNDAI	NISSAN

2.6.1 Use the data to complete the tally and frequency column of the frequency distribution table.

Cars	Tally	Frequency

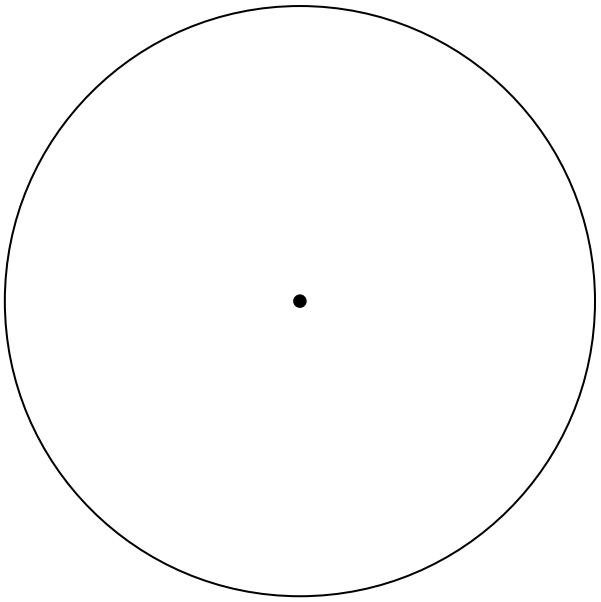
(5)

2.6.2 Use the data to draw a bar graph on the diagram below.



(5)

2.6.3 Use the frequency table to construct a pie chart as degrees on the diagram below. Show all calculations.



(5)

2.7 The following table shows the number of Covid-19 vaccinations done in a district clinic for 20 days in June 2021:

59	85	97	50	86	70	98	69	95	63
65	92	77	93	57	70	99	57	70	74

2.7.1 Construct a stem-and-leaf diagram. (5)

2.7.2 Determine the mean of the data. (2)

2.7.3 Determine the median of the data. (2)

2.7.4 Write down the mode of the data. (1)

2.8 The following were the number of days 32 recovered Covid-19 patients spent in hospital in December 2020 before they were discharged:

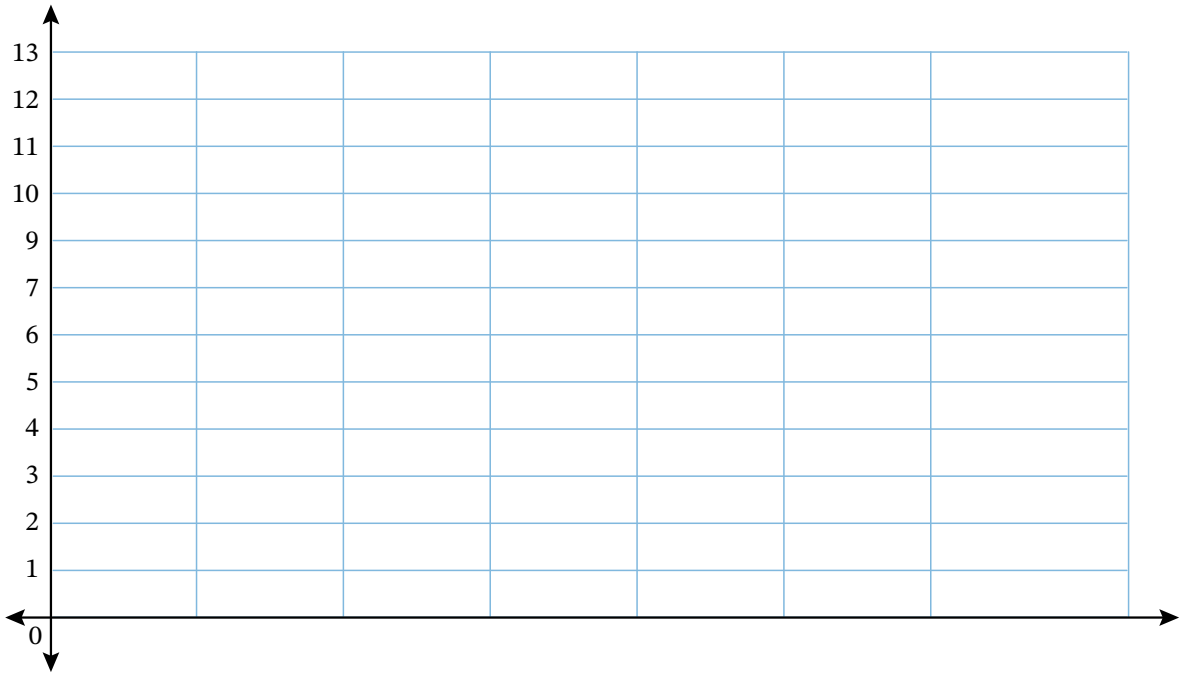
14	23	14	13
7	21	17	24
10	13	25	20
21	14	30	12
9	8	15	17
26	22	11	15
11	18	16	22
15	9	14	19

2.8.1 Use the data to complete the tally and frequency columns of the frequency distribution table below.

Days (n) hospitalised	Tally	Frequency
$5 < n \leq 10$		
$10 < n \leq 15$		
$15 < n \leq 20$		
$20 < n \leq 25$		
$25 < n \leq 30$		
	TOTAL	32

(5)

2.8.2 Use the data to draw a histogram on the diagram below.



(10)

2.8.3 Give the modal class. (1)

2.8.4 Construct a frequency polygon on the histogram. (7)

2.9 A college tuckshop wants to stock fruit and conducts a survey to determine which fruits are most popular among students. A total of 30 students are included with the following results:

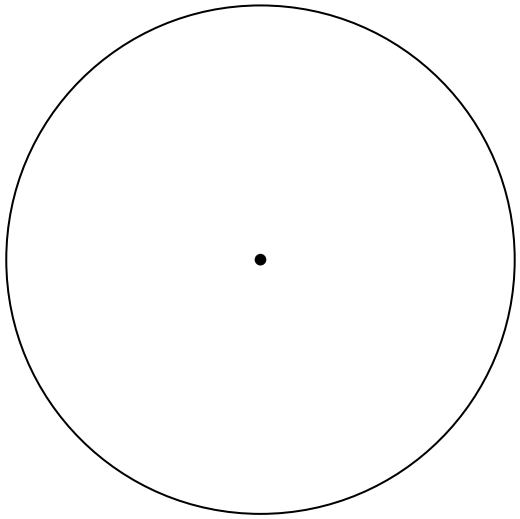
Choice of fruit		
Banana	Apple	Banana
Banana	Apple	Apple
Apple	Orange	Orange
Orange	Banana	Apple
Apple	Orange	Apple
Apple	Apple	Apple
Orange	Apple	Orange
Apple	Banana	Apple
Orange	Apple	Banana
Apple	Orange	Orange

2.9.1 Use this data to complete the **Tally** and **Frequency** columns of the frequency distribution table below..

Fruit	**Tally**	**Frequency**	**Frequency percentage**
Apples			
Bananas			
Oranges			
		Total	**100%**

2.9.2 Calculate the percentage of the total for the frequency of each fruit. Show this in the column with the heading **percentage frequency** in the frequency distribution table. (7)

2.9.3 Use the frequency table to construct a pie chart in the pie provided below. Give a heading in the space provided. (7)



2.10 In a competition at a dog parlour 40 judges voted for their choice of dog breed. The table represents the raw data collected by the adjudicators.

CHOICE OF DOG BREED	
Labrador	Husky
Pug	Jack Russell
Husky	Labrador
Labrador	Jack Russell
Husky	Pug
Husky	Husky
Pug	Fox terrier
Labrador	Pug
Jack Russell	Fox terrier
Pug	Pug
Labrador	Husky
Husky	Labrador
Husky	Labrador
Fox terrier	Husky
Husky	Jack Russell
Jack Russell	Fox terrier
Husky	Pug
Pug	Husky
Labrador	Jack Russell
Fox terrier	Husky

2.10.1 Use the information above and complete the frequency distribution table (tally chart) below.

Dog breed	Tally	Frequency
Labrador	𝍸 |	8
Husky		
Jack Russell		
Pug		
Fox terrier		
	TOTAL:	

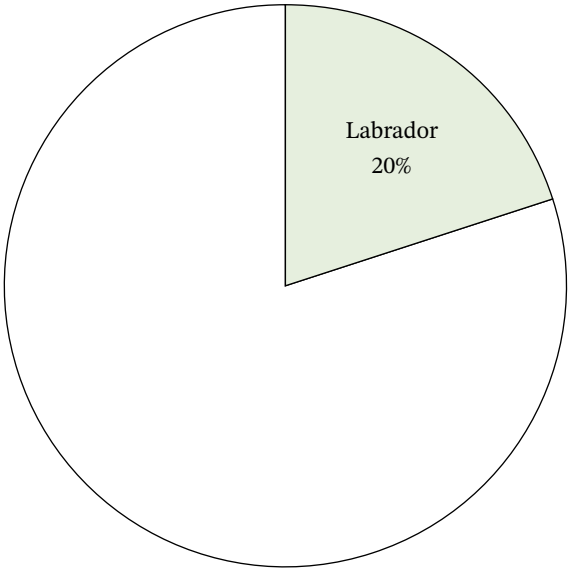
(5)

2.10.2 Which dog has been voted as the judge's choice of dog breed? (1)

2.10.3 Construct a pie chart graph on the diagram below that represents the information on the table in QUESTION 2.10.1 Show the calculations for the percentage of each pie area and indicate the dog breed in the relevant area. (7)

Labrador: $\frac{8}{40} \times 360° = 72°$

Percentage: $\frac{8}{40} \times 100 = 20\%$



Question papers Maths L2

Introduction to Paper 1 and Paper 2

Proposed mark distribution between Paper 1 and Paper 2 for external examination papers

Paper 1	
Topics	**Marks**
1. Numbers	30
2. Functions and Algebra	
2.1 Functions	25
2.2 Algebra	25
5. Financial Mathematics	20
Total	**100**

Paper 2	
Topics	**Marks**
3. Space, Shape and Measurement	
3.1 Geometry	30
3.2 Trigonometry	30
4. Data Handling	40
Total	**100**

Formula sheets

- Paper 1
- Paper 2
- Chapter 5: Financial Maths (Paper 1)

Chapter 5: **Financial Maths** (Paper 1)

QUESTION 1: Personal and household finances (financial concepts, budgets)

1.1 Choose a term from COLUMN B that matches a description in COLUMN A. Write only the letter (A–H) next to the question number (1.1.1–1.1.6).

COLUMN A		COLUMN B	
1.1.1	A bank card used to regulate transactions from bank accounts with money to spend; offers an overdraft for unexpected, urgent expenses	A	variance
1.1.2	Money invested in a bank for a specific period of time at a fixed rate of interest	B	Balance Sheet
1.1.3	Money paid to students in order to complete a course of study at an institution of learning	C	audit
1.1.4	A formal examination of an organisation's financial statements and controls	D	fixed deposit
1.1.5	Difference between budgeted and actual amounts	E	debit card
1.1.6	A summary of a assets and liabilities as at a specific date	F	interest
		G	credit card
		H	bursary

(6 × 1) (6)

1.2 Choose an item from COLUMN B that matches a description in COLUMN A. Write only the letter (A–H) next to the question number (1.2.1–1.2.5).

COLUMN A		COLUMN B	
1.2.1	An account opened at a bank into which money can be paid (e.g. a salary) and withdrawn at a counter or from an automatic teller machine (ATM)	A	unit trust
1.2.2	Money invested in a bank for a specific period at a fixed rate of interest	B	short-term investment
1.2.3	A form of collective investment constituted under a trust. It is a medium to long-term investment that is aimed at beating inflation. It allows one, along with other investors, to pool funds in different investment options	C	debit card
1.2.4	An investment where the benefits can be used after a short term, for example one year	D	fixed deposit
1.2.5	A bank card that is used to regulate transactions from a bank account containing money to spend	E	bank fees
		F	credit card
		G	long-term investment
		H	savings account

(5 × 1) (5)

1.3 Sipho's family drew up the following monthly budget for 2026:

INCOME		EXPENDITURE	
Father's salary	R7 150	Bond instalment	R2 700
Mother's salary	**C**	Car instalment	R1 950
Interest on investment	R534	Water and Electricity	**A**
		Cell phones	R400
		Food/entertainment	R3 000
		Clothes	R1 200
		Petrol and vehicle maintenance	R1 500
		Insurance	R392
		School fees	**B**
		Tithes	R 715
		Total expenditure	R12 184

1.3.1 The family's expenditure on water and electricity was R180 per month during the previous year, but they want to budget for an increase of 15%. Calculate the new amount after the 15% increase for water and electricity (A). (2)

1.3.2 School fees are R60 per month per student. The family has two children in school, and they pay school fees monthly. Calculate the total monthly school fees (B). (1)

1.3.3 Calculate Sipho's mother's monthly salary (C) if the family has a surplus of R1 550 at the end of the month. (2)

1.4 Thandi decides to buy a dishwasher based upon the advertisement below:

Thandi decides to buy the dishwasher using the instalment option.

1.4.1 Calculate the balance owing after paying the deposit. (2)

1.4.2 Calculate the total amount that will be paid if Thandi opts for the hire-purchase option. (3)

1.5 Choose an item or word from COLUMN B that matches a description in COLUMN A. Write only the letter (A–I) next to the question number (1.5.1–1.5.6).

COLUMN A		COLUMN B	
1.5.1	A card that is used to get goods or services before they are paid for. It is based on the guarantee that payment will be made later	A	income
1.5.2	The difference between the budgeted amount and actual amount	B	debit card
1.5.3	The initial amount of money that is put into an investment or is borrowed	C	interest rate
1.5.4	A plan of your monthly income and expenditures in order to manage your finances	D	credit card
1.5.5	All the money you can earn or receive	E	variance
1.5.6	A percentage that regulates the interest you will receive on your savings or will have to pay on hire-purchase amounts and overdrafts	F	principal amount
		G	budget
		H	variable
		I	payment

(6 × 1) (6)

1.6 Sarah is a university student. Her parents give her a monthly allowance of R3 500 to cover her expenses, which consist of the following:

- Monthly cell phone payments, which add up to 9,5% of her allowance
- A total monthly instalment of R300 for two clothing stores, Zap and Azania Fashion
- Daily cost of R45 for food
- R110 per weekend for entertainment
- Transport costs

The table below shows Sarah's budget for April (April has 30 days with 4 weekends):

April 2028 budget	
Monthly cell phone payments	A
Zap account	R195
Azania Fashion account	B
Food for the month	C
Weekend entertainment	D
Transport	E
Total	**R3 500**

Calculate and write down the missing amounts A–E. (5)

1.7 Match each of the following definitions to their terms. Give your answer in your answer booklet by writing the letter attached to the term (A to F) next to the question number (1.7.1 to 1.7.6).

Term		Definition	
1.7.1	Saving account	A	Money paid to the bank for the services it renders.
1.7.2	Fixed deposit	B	An interest-bearing account held at a bank or other financial institution.
1.7.3	Unit trust	C	Financial investments that can easily be converted to cash, typically within 5 years
1.7.4	Short-term investment	D	Used to make payments for purchases so that money is immediately deducted from the consumer's account.
1.7.5	Debit card	E	A collective investment fund that is bought and sold in units.
1.7.6	Bank fees	F	Money invested in a bank for a specific period.

(6 × 1) (6)

1.8 Mamashele is a farm worker who works 23 days per month. He works for 170 hours per month and earns a net wage of R50 per hour. He works away from home and rents a small flat. His monthly expenses are as follows:

Rental of flat (including water and electricity)	R2 200
Transport	R18 per day
Cellphone contract	R147
Groceries	R1 800
Clothing account	R460
Entertainment	R400
Laundry service	R250

Use the given information to fill in the Income and Expenditure Statement. (6)

Income and Expenditure Statement

INCOME & EXPENDITURE: MAMASHELE A FARM WORKER	
INCOME	**AMOUNT**
Net wage	
170 hours @ R50 per hour	
Net monthly earnings	
EXPENDITURE	**AMOUNT**
Rental of flat	
Transport	
Cellphone	
Groceries	
Clothing	
Entertainment	
Laundry service	
TOTAL MONTHLY EXPENDITURE	
Amount left after all the expenses have been paid	

1.9 Choose a term from COLUMN B that matches a description in COLUMN A. Write only the letter (A–H) next to the question number (1.9.1–1.9.5).

COLUMN A		COLUMN B	
1.9.1	Amount of money spent or used to buy or do something	A	fixed expense
1.9.2	Itemised summary of expected income and expenses over a specified period	B	variance
1.9.3	Expense that varies from month to month	C	Balance Sheet
1.9.4	Financial statement described as a snapshot of a company's financial position	D	variable expense
1.9.5	Difference between the actual amount and the budgeted amount in a budget	E	budget
		F	cheque
		G	expenses
		H	stokvel

(5 × 1) (5)

1.10 The table below shows Adriaan's financial statement for one month.

ADRIAAN'S BUDGET			
INCOME	**Projected**	**Actual**	**Variance**
Allowance	R6 500,00	R6 600,00	R100,00
Tips as waiter	R300,00	R105,00	–R195,00
TOTAL:	R6 800,00	R6 705,00	–R95,00
EXPENSES	**Projected**	**Actual**	**Variance**
Housing	R2 300,00	R2 300,00	R0,00
Transport	R400,00	R350,00	R50,00
Personal hygiene	R165,00	R265,00	–R100,00
Clothing	R455,00	R525,00	–R70,00
Entertainment	R120,00	R55,00	R65,00
Monthly savings bicycle	R70,00	R65,00	R5,00
Food	R2 350,00	R2 500,00	–R150,00
Books and stationary	R450,00	R150,00	R300,00
Gym membership	R110,00	R110,00	R0,00
Long-term investment	R25,00	R25,00	R0,00
TOTAL:	R6 445,00	R6 320,00	R125,00
Surplus/Deficit	**R355,00**	**R385,00**	**R30,00**

1.10.1 Adriaan's accountant told him that the variance of R300 under *Books and Stationery* in his expenses section is favourable.

Explain why the accountant says this. (1)

1.10.2 Choose the correct word from those given in brackets. Write the word and give a reason for the answer: The amount of –R95 in the income column is (favourable/unfavourable). (2)

1.10.3 Will Adriaan have an actual surplus or deficit at the end of the month? How much will it be? (2)

1.10.4 Three items in the budget are considered as fixed. What do these items have in common? (1)

1.11 When Liesl was about to get married, she drew up a budget for her wedding. After the wedding she completed the budget by adding all the actual incomes and expenses.

Consider the information below and answer the questions.

INCOME	Planned	Actual
Parents' contribution	R60 000,00	R60 000,00
Savings	R7 000,00	R4 500,00
Loan	R23 000,00	R23 000,00
Cash gifts	R6 000,00	R4 560,00
TOTALS	**R96 000,00**	**R92 060,00**
	Variance in the total income	**A**
EXPENSES	**Estimated**	**Actual**
Wedding and accessories (bride and groom)	R18 000,00	R22 000,00
Ceremony	R5 000,00	R4 600,00
Reception	R38 000,00	R41 000,00
Flowers and decorations	R3 500,00	R3 500,00
PA, audio visual	R2 000,00	R3 000,00
Photos and videos	R16 000,00	R13 350,00
Candles and fairy lights	R7 500,00	R8 000,00
Equipment hire	R1 500,00	R2 040,00
TOTALS	**R91 500,00**	**R97 490,00**
	Variance in total expenses	**B**

1.11.1 Calculate the values for A of B in the budget. (2)

1.11.2 Would Liesl have a surplus or deficit after she had done the reconciliation (balancing) of her finances? How much was the surplus/deficit? (1)

1.11.3 Consider the cost for the photos and videos in the expenses table.

(a) Determine the variance in the cost for the photos and videos.

(b) Was this a favourable or unfavourable scenario when considering the variance? (2 × 1) (2)

1.12 Choose a term from COLUMN B that matches the description in COLUMN A. Write only the letter (A–H) next to the question number (1.12.1–1.12.5).

COLUMN A	COLUMN B
1.12.1 Expenses that stay the same and are paid regularly	A bank fees
1.12.2 Money put in a business enterprise or a financial institution	B variance
1.12.3 The difference between the actual and projected amounts in a budget	C credit card
1.12.4 A card issued by a bank to enable the holder to pay for purchases, where the money is transferred directly from the holder's account to the seller	D debit card
1.12.5 The fees normally associated with services rendered by banks	E investment
	F savings
	G fixed expenses
	H stokvel

(5 × 1) (5)

QUESTION 2: Simple and compound interest

2.1 William received an expression of appreciation from his dad in the amount of R5 000 for passing NCV Level 2 with four distinctions. William deposited this money into a savings account. Calculate the final amount that will be available after five years if the interest is calculated at 6% simple interest annually. (5)

2.2 William finished his NCV Level 4 and secured a studentship at a well-known company that gives him a monthly stipend of R6 500. William plans to give his father a surprise gift for his birthday. He buys a refrigerator for R10 500 through a hire-purchase agreement. The initial amount due to be paid off is R10 500 compounded annually at a rate of 11% for three years.

Determine mathematically:

2.2.1 The amount William will pay for the fridge (5)

2.2.2 The monthly repayments (2)

2.2.3 The total interest paid. (2)

2.3 Bongani purchases a HD television set that is priced at R19 000 on a hire purchase agreement. The store agrees that he could pay the television off over a period of 3 years but he will be charge at an interest rate of 12% per annum over the payment period. The store also offers an insurance on the television set and he is obligated to take the insurance that is charged at R35 per month over the 3 years. In order to take possession of the television set, Bongani will have to pay a 10% cash deposit. Determine the total amount that he actually pays for the television set at the end of 3 years. (5)

2.4 An amount of R1 300 has accumulated interest to reach R1 466 after three years. Find the interest rate if the investment was paid using compound interest. (4)

2.5 Boikgantsho and Bokamoso are the twin sons of Mr Madigoe. Their father gave each of them R2 500 to invest. Boikgantsho decided to invest the money at 12% simple interest per annum for five years and Bokamoso invested the same amount at 10% compound interest per annum for five years.

Calculate:

2.5.1 The total amount Boikgantsho will receive after five years (2)

2.5.2 The total amount Bokamoso will receive after five years (2)

2.5.3 Explain which is the better investment and give a reason why. (1)

2.6 Sejeng invested R12 000 at 16% simple interest per annum for five years. Masese invested the same amount at 16% compound interest per annum for five years.

Calculate:

2.6.1 The total amount Sejeng will receive after five years. (2)

2.6.2 The interest Sejeng will have earned after five years. (2)

2.6.3 The total amount Masese will receive after five years. (2)

2.6.4 The interest Masese will have earned after four years. (2)

2.6.5 Explain which investment is better. (1)

2.7 Martha wants to buy a computer on the Internet which is advertised for R5 600. There is an option of paying a 10% deposit and then making 24 monthly payments using a hire-purchase agreement where interest is calculated at 15% per annum simple interest.

2.7.1 Determine the amount that she will still owe after she has paid the 10% deposit. (2)

2.7.2 Calculate what Martha's monthly payments will be on the balance as determined in Question 2.7.1 if the hire-purchase agreement charges an interest rate of 15% per annum simple interest. (3)

2.7.3 What amount must Martha deposit for a period of TWO years at 7% compound interest to accumulate to R5 600 after TWO years? (4)

2.8 The wedding dress that Liesl wanted to purchase costs R15 000. She could purchase it using her credit card or she could pay it off over 3 years if she made use of a hire purchase agreement.

2.8.1 Determine how much Liesl would eventually pay if she decided to use the hire purchase agreement at a rate of 18% per annum simple interest over 3 years. (3)

2.8.2 Determine how much Liesl would eventually pay if she decided to use her credit card where the rate was 18% compound interest per annum over 3 years. (4)

2.8.3 The original cash price for the dress was R15 000. In 3 years' time, due to inflation, the cost of the same dress would be R18 017,36. What would be the average inflation rate (as a percentage) for that period? (3)