



KWAZULU-NATAL PROVINCE

EDUCATION
REPUBLIC OF SOUTH AFRICA

NATIONAL SENIOR CERTIFICATE

GRADE 10

MATHEMATICS PAPER 1

NOVEMBER 2025

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MARKS: 100

TIME: 2 hours

This question paper consists of 8 pages, including an information sheet.

INSTRUCTIONS AND INFORMATION

Read the following instructions carefully before answering the questions.

1. This question paper consists of 7 questions.
2. Answer ALL the questions.
3. Number the answers correctly according to the numbering system used in this question paper.
4. Clearly show ALL calculations, diagrams, graphs, etc. which you have used in determining your answers.
5. Answers only will NOT necessarily be awarded full marks.
6. You may use an approved scientific calculator (non-programmable and non-graphical), unless stated otherwise.
7. If necessary, round off answers correct to TWO decimal places, unless stated otherwise.
8. Write neatly and legibly.

QUESTION 1

1.1 Simplify the following completely:

1.1.1 $(2x-3)(2x+3)$ (2)

1.1.2 $-5x(2x-1)^2 + 3$ (3)

1.1.3 $\frac{(2^x)^3 \cdot 27^x}{8^x \cdot (3^2)^x \cdot 3^x}$ (3)

1.2 Factorise the following expressions fully:

1.2.1 $2p^2 - p - 15$ (2)

1.2.2 $y - b + by - 1$ (3)

1.2.3 $5m^3 - 40$ (3)

1.3 Calculate the value of the following, WITHOUT the use of a calculator:

$$\frac{2010 \times (2013^2 - 9) \times 2012}{2016 \times (2011^2 - 1)} \quad (4)$$

[20]

QUESTION 2

2.1 Solve for x **without using a calculator**:

2.1.1 $2^{3x-4} = \frac{1}{512}$ (3)

2.1.2 $\frac{4}{x-5} - \frac{10}{x} = \frac{2}{x^2-5x}$ (4)

2.2 At a school event, tickets are sold at two different prices: R20 for adults and R12 for learners. A total of 20 tickets were sold, collecting R320 in total. How many adult tickets and learner tickets were sold?

Let the number of adult tickets be x and the number of learner tickets be y . (6)

[13]

QUESTION 3

3.1 The n^{th} term of an arithmetic sequence is given as $T_n = 7n - 3$.

3.1.1 Determine the first term of the sequence. (1)

3.1.2 Which term is equal to 683? (3)

3.2 A grade 10 learner wrote the word **WHEAT** over and over again on a piece of paper as follows:

WHEATWHEATWHEATWHEATWHEAT.....

3.2.1 Write down the 30th letter. (1)

3.2.2 Determine the 508th letter. (3)

3.2.3 The first H is in the second position, the second H is in the seventh position, the third H is in the twelfth position, and so forth. Determine in which position the 103rd H is? (3)

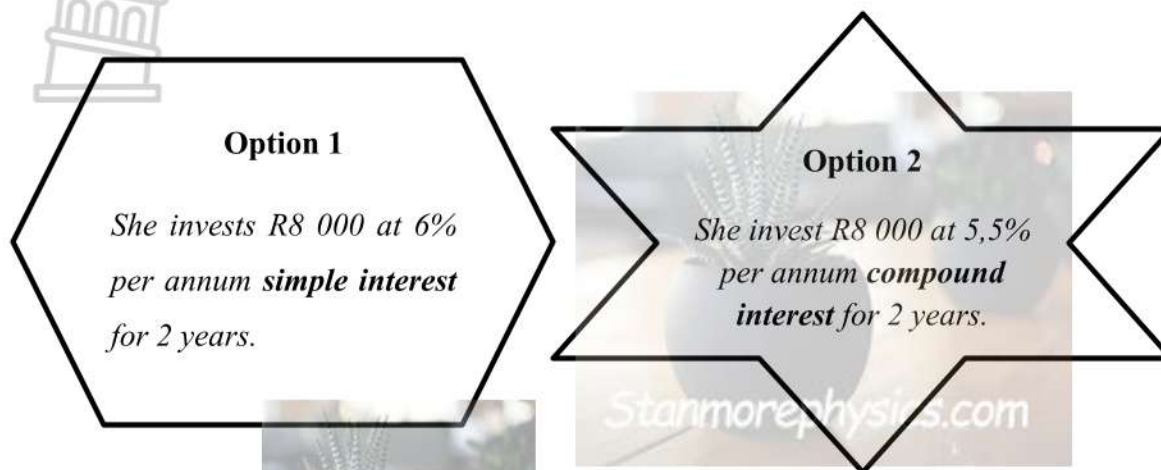
3.3 Consider the number pattern: $-3 \times 1; -7 \times 4; -11 \times 7; -15 \times 10$.

Determine the 62nd term of the above pattern. (4)

[15]

QUESTION 4

Amanda is planning a trip to England in 2 years. She considers two different ways to save her money.



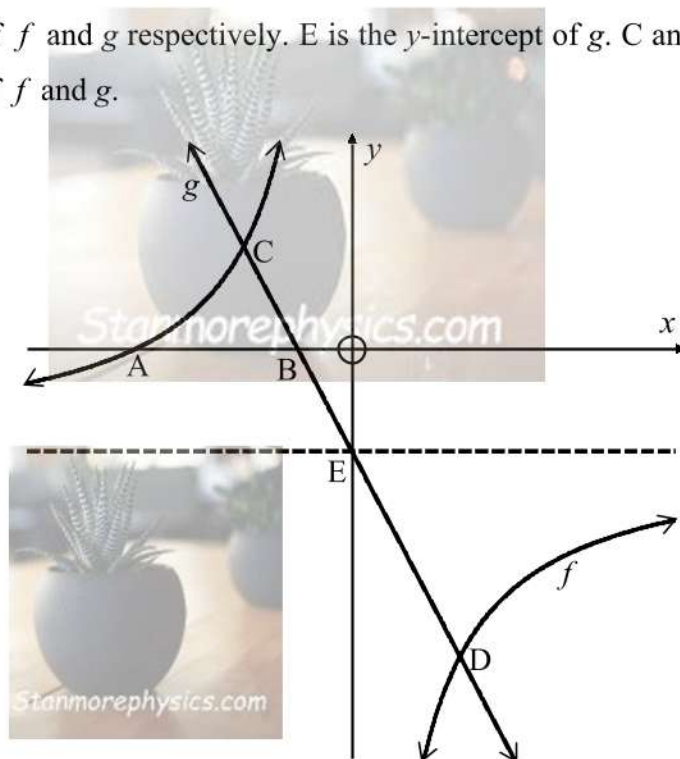
- 4.1 Calculate the total amount Amanda will have after 2 years if she chooses the 2nd option. (2)
- 4.2 Which option gives Amanda a better return after 2 years? Show calculations to support your answer. (3)
- 4.3 If the exchange rate is £1 = R22,50. How many British pounds (£) will she have after 2 years if she chooses the better option? (2)
- 4.4 Suppose instead she wants to use option 1, but save monthly. If the bank agrees to let her save a fixed amount every month for 2 years, and she wants a total of R9 000, calculate the fixed monthly payment.

(Assume the interest is only calculated on the total of all deposits at the end of 2 years) (3)

[10]

QUESTION 5

- 5.1 Sketched below are the graphs of $f(x) = -\frac{2}{x} - 1$ and $g(x) = -2x - 1$. Points A and B are x-intercepts of f and g respectively. E is the y-intercept of g . C and D are the points of intersection of f and g .



- 5.1.1 Write down:
- the y -coordinate of E. (1)
 - the equation of the vertical asymptote of f . (1)
- 5.1.2 Determine the coordinates of B. (2)
- 5.1.3 Calculate the length of AB. (4)
- 5.1.4 Determine the coordinates of C and D. (5)
- 5.1.5 Determine the value(s) of x for which:
- f is increasing. (1)
 - $\frac{g(x)}{f(x)} \leq 0$ (3)
- 5.1.6 If $h(x) = f(-x) + 3$. Describe in words the transformation from f to h . (2)

5.2 Use the following properties to sketch the graph of p if $p(x) = a \times b^x + q$:

- $a > 0$
- $0 < b < 1$
- $q < 0$

(3)

[22]

QUESTION 6

Given: $m(x) = -2x^2 + 8$

6.1 Determine the x – intercepts of m .

(2)

6.2 Sketch the graph of m .

(3)

6.3 Determine the value(s) of k for which $m(x) = k$ will have no solution.

(1)

6.4 Determine the maximum value of $3^{m(x)-5}$.

(2)

[8]

QUESTION 7

7.1 If $P(D) = 0,25$; $P(K) = 0,5$ and $P(D \text{ or } K) = 0,625$

7.1.1 Calculate $P(D \text{ and } K)$.

(2)

7.1.2 Are events D and K complementary? Give a reason.

(2)

7.2 A survey was conducted among 100 learners to determine their participation in two subjects: **Maths (M)** and **Life Orientation (LO)**. The following results were obtained:

- 42 learners participate in Maths.
- 35 learners participate in Life Orientation.
- x learners participate in both subjects.
- 38 learners did not participate at all.

7.2.1 Draw a Venn diagram to represent the above information.

(3)

7.2.2 Determine the number of learners who participated in both subjects.

(2)

7.2.3 Determine the probability that a learner selected at random participates in:

a) Neither Maths nor LO.

(1)

b) Maths or LO.

(1)

c) Maths only.

(1)

[12]

TOTAL MARKS: 100

INFORMATION SHEET: MATHEMATICS

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$A = P(1 + mi)$$

$$A = P(1 - mi)$$

$$A = P(1 - i)^n$$

$$A = P(1 + i)^n$$

$$T_n = a + (n - 1)d$$

$$S_n = \frac{n}{2}[2a + (n - 1)d]$$

$$T_n = ar^{n-1}$$

$$S_n = \frac{a(r^n - 1)}{r - 1} ; r \neq 1$$

$$S_\infty = \frac{a}{1 - r} ; -1 < r < 1$$

$$F = \frac{x[(1 + i)^n - 1]}{i}$$

$$P = \frac{x[1 - (1 + i)^{-n}]}{i}$$

$$f'(x) = \lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h}$$

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

$$M\left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right)$$

$$y = mx + c$$

$$y - y_1 = m(x - x_1)$$

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

$$m = \tan \theta$$

$$(x - a)^2 + (y - b)^2 = r^2$$

In $\triangle ABC$:

$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

$$a^2 = b^2 + c^2 - 2bc \cos A$$

$$\text{area } \triangle ABC = \frac{1}{2} ab \sin C$$

$$\sin(\alpha + \beta) = \sin \alpha \cos \beta + \cos \alpha \sin \beta$$

$$\sin(\alpha - \beta) = \sin \alpha \cos \beta - \cos \alpha \sin \beta$$

$$\cos(\alpha + \beta) = \cos \alpha \cos \beta - \sin \alpha \sin \beta$$

$$\cos(\alpha - \beta) = \cos \alpha \cos \beta + \sin \alpha \sin \beta$$

$$\cos 2\alpha = \begin{cases} \cos^2 \alpha - \sin^2 \alpha \\ 1 - 2\sin^2 \alpha \\ 2\cos^2 \alpha - 1 \end{cases}$$

$$\sin 2\alpha = 2\sin \alpha \cos \alpha$$

$$\bar{x} = \frac{\sum x}{n}$$

$$\sigma^2 = \frac{\sum_{i=1}^n (x_i - \bar{x})^2}{n}$$

$$P(A) = \frac{n(A)}{n(S)}$$

$$P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$$

$$\hat{y} = a + bx$$

$$b = \frac{\sum (x - \bar{x})(y - \bar{y})}{\sum (x - \bar{x})^2}$$



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MATHEMATICS P1
NOVEMBER 2025
MARKING GUIDELINE

MARKS: 100

This marking guideline consists of 9 pages.

QUESTION 1

1.1.1	$4x^2 + 6x - 6x - 9$ $4x^2 - 9$	Answer only; Award Full Marks	✓ A products ✓ A answer (2)
1.1.2	$-5x(4x^2 - 4x + 1) + 3$ $-20x^3 + 20x^2 - 5x + 3$		✓ A $4x^2 - 4x + 1$ ✓ CA $-20x^3 + 20x^2$ ✓ CA $-5x + 3$ (3)
1.1.3	$\frac{2^{3x} \cdot 3^{3x}}{2^{3x} \cdot 3^{2x} \cdot 3^x}$ $= 2^0 \times 3^0$ $= 1$		✓ A prime bases ✓ CA simplification ✓ CA answer (3)
1.2.1	$(2p+5)(p-3)$		✓ A $(2p+5)$ ✓ A $(p-3)$ (2)
1.2.2	$= y - 1 + by - b$ $= (y-1) + b(y-1)$ $= (y-1)(1+b)$	OR $= y + by - b - 1$ $= y(1+b) - (b+1)$ $= (1+b)(y-1)$	✓ A rearranging ✓ A factors ✓ A answer (3)
1.2.3	$5(m^3 - 8)$ $= 5(m-2)(m^2 + 2m + 4)$		✓ A common factor ✓ A $(m-2)$ ✓ A $(m^2 + 2m + 4)$ (3)
1.3	$= \frac{(2010)(2013+3)(2013-3) \times 2012}{2016 \times (2011+1)(2011-1)}$ $= \frac{(2010)(2016)(2010) \times 2012}{2016 \times (2012)(2010)}$ $= 2010$	Answer Only; 0/4	✓ A numerator (factors) ✓ A denominator ✓ A simplification ✓ A answer
OR			

$\begin{aligned} \text{let } 2010 &= x \\ x \left[(x+3)^2 - 9 \right] (x+2) &= (x+6) \left[(x+1)^2 - 1 \right] \\ &= \frac{x(x+2)(x^2+6x)}{(x+6)(x^2+2x)} \\ &= \frac{x \cdot x(x+2)(x+6)}{x(x+6)(x+2)} \\ &= x \\ &= 2010 \end{aligned}$	✓ A numerator (factors) ✓ A denominator ✓ A simplification ✓ A answer (4)
[20]	

QUESTION 2

2.1.1	$\begin{aligned} 2^{3x-4} &= 2^{-9} \\ 3x-4 &= -9 \\ x &= -\frac{5}{3} \end{aligned}$	✓ A 2^{-9} ✓ CA equating exp. ✓ CA answer (3)
2.1.2	$\frac{4}{x-5} - \frac{10}{x} = \frac{2}{x(x-5)}$ LCD = $x(x-5)$ restrictions : $x \neq 0$ or $x \neq 5$ $\begin{aligned} 4x - 10(x-5) &= 2 \\ -6x &= -48 \\ x &= 8 \end{aligned}$	✓ A $x(x-5)$ ✓ A restrictions $x \neq 0$ or $x \neq 5$ ✓ A simplification ✓ CA answer (4)
2.2	$\begin{aligned} x+y &= 20 && \text{.....(1)} \\ 20x+12y &= 320 && \text{.....(2)} \\ y &= 20-x && \text{.....(3)} \\ 20x+12(20-x) &= 320 \\ 20x+240-12x &= 320 \\ 8x &= 80 \\ x &= 10 \\ y &= 10 \end{aligned}$	✓ A Equation 1 ✓ A Equation 2 ✓ CA Equation 3 ✓ CA substitution ✓ CA x-value ✓ CA y-value

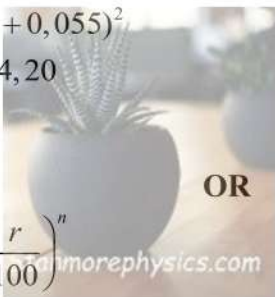
	OR $x + y = 20 \quad \dots\dots(1)$ $20x + 12y = 320 \quad \dots\dots(2)$ $x = 20 - y \quad \dots\dots(3)$ $20(20 - y) + 12y = 320$ $400 - 20y + 12y = 320$ $8y = 80$ $y = 10$ $x = 10$ $\therefore$ 10 adult tickets and 10 learner tickets were sold.	✓A Equation 1 ✓A Equation 2 ✓CA Equation 3 ✓CA substitution ✓CA x-value ✓CA y-value (6)
[13]		

QUESTION 3

3.1.1	$T_1 = 4$ 	✓A 4 (1)
3.1.2	$683 = 7n - 3$ $686 = 7n$ $n = 98$	✓A equating ✓CA simplification ✓CA answer ($n \in \mathbb{N}$) (3)
3.2.1	T	✓A answer (1)
3.2.2	$\begin{array}{r} 508 \\ 5 \\ \hline = 101,6 \\ 0,6 \times 5 = 3 \\ \Rightarrow 3^{\text{rd}} \text{ letter} \end{array}$ $\therefore$ E OR $\begin{array}{r} 510 \\ 5 \\ \hline = 102 \end{array} \rightarrow (510 \text{ is divisible by } 5)$ 510 to 508 = 3 steps backwards $\Rightarrow 3^{\text{rd}} \text{ letter}$ $\therefore$ E	✓A dividing by 5 ✓A remainder times 5 ✓A answer OR ✓A any number nearest to 508 & divisible by 5 510 or 505 ✓A method (backwards or forward) ✓A answer (3)

3.2.3	$T_n = 5n - 3$ $T_{103} = 5(103) - 3$ $= 512$	✓ A $5n - 3$ ✓ CA subst. $n = 103$ ✓ CA answer (3)
3.3	$(-4k + 1)(3d - 2)$ $= [-4(62) + 1][3(62) - 2]$ $= -247 \times 184$ Accept: -45 448 as the final answer	✓ A ✓ A $(-4k + 1)(3d - 2)$ ✓ CA substitution ✓ CA answer (4)
[15]		

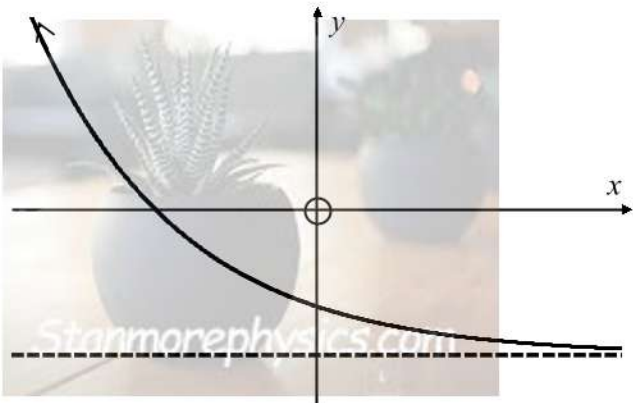
QUESTION 4

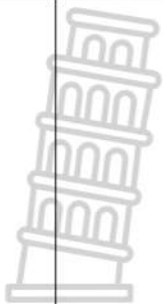
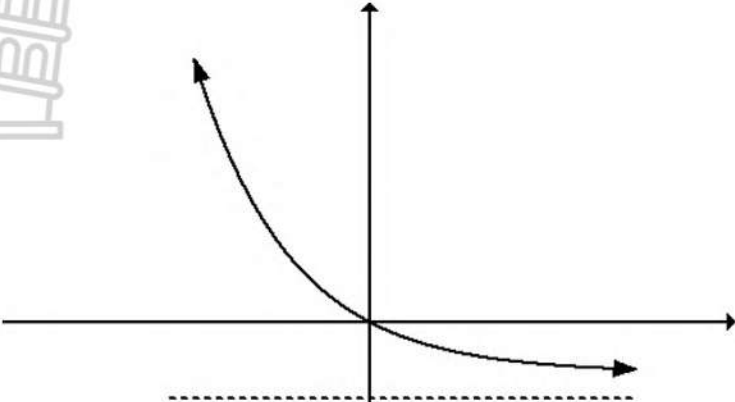
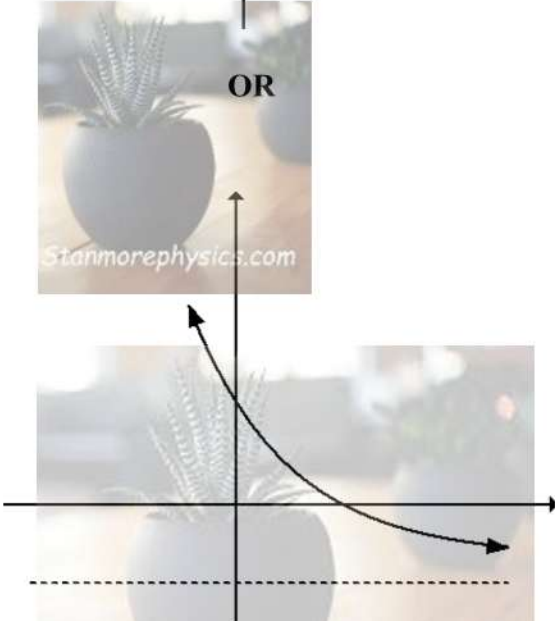
4.1	$A = P(1 + i)^n$ $= 8000(1 + 0,055)^2$ $= R\ 8\ 904,20$  OR $A = P \left(1 + \frac{r}{100} \right)^n$ $= 8000 \left(1 + \frac{5,5}{100} \right)^2$ $= R\ 8\ 904,20$	✓ A subs. into correct formula ✓ CA answer OR ✓ A subs. into correct formula ✓ CA answer (2)
4.2	$A = P(1 + ni)$ $= 8000(1 + 2 \times 0,06)$ $A = R\ 8\ 960$ $\therefore$ Option 1 or simple interest OR $A = P \left(1 + \frac{nr}{100} \right)$ $= 8000 \left(1 + \frac{2 \times 6}{100} \right)$ $A = R\ 8\ 960$ $\therefore$ Option 1 or simple interest	✓ A subs. into correct formula ✓ CA future value ✓ CA answer OR ✓ A subs. into correct formula ✓ CA future value ✓ CA answer (3)

4.3	$R 8960 \times \frac{£1}{R22,50}$ $= £ 398,22$	✓ CA dividing by 22,5 ✓ CA answer (2)
4.4	$A = P(1 + ni)$ $9000 = P(1 + 2 \times 0,06)$ $P = R 8035,71$ $\frac{0}{3}$ if wrong formula used $\text{Fixed monthly payment} = \frac{8035,71}{24}$ $= R 334,82$	✓ A value of P ✓ A dividing P by 24 ✓ CA answer (3)
[10]		

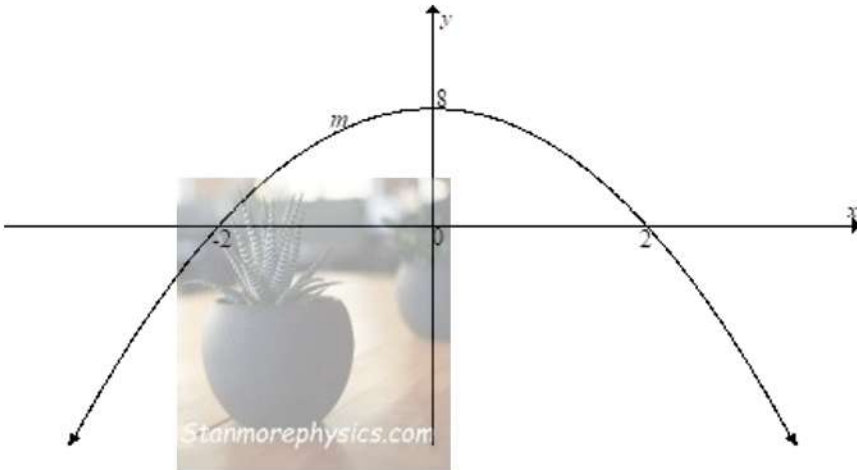
QUESTION 5

5.1.1 a)	$y = -1$	✓ A $y = -1$ (1)
5.1.1 b)	$x = 0$	✓ A $x = 0$ (1)
5.1.2	$0 = -2x - 1$ $x = -\frac{1}{2}$ $B\left(-\frac{1}{2}; 0\right)$ Answer only; Award Full marks	✓ A equating to 0 ✓ CA answer (in coordinate form) (2)
5.1.3	$0 = -\frac{2}{x} - 1$ $1 = -\frac{2}{x}$ $x = -2 \quad A(-2; 0)$ $AB = -\frac{1}{2} + 2 = 1,5 \text{ units}$ OR $0 = -\frac{2}{x} - 1$ $1 = -\frac{2}{x}$ $x = -2 \quad A(-2; 0)$ $AB = \sqrt{\left(-\frac{1}{2} + 2\right)^2 + (0 - 0)^2}$ $= 1,5 \text{ units}$	✓ A $f(x) = 0$ ✓ CA x_A ✓ CA difference ✓ CA answer OR ✓ A $f(x) = 0$ ✓ CA x_A ✓ CA using the distance formula ✓ CA answer (4)

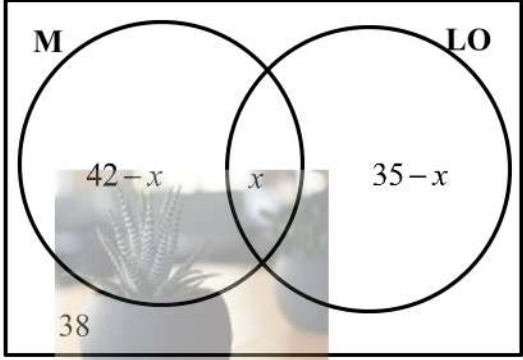
5.1.4	$\frac{2}{x} - 1 = -2x - 1$ $\frac{2}{x} = -2x$ $x^2 - 1 = 0$ $(x+1)(x-1) = 0$ $x = -1 \text{ or } x = 1$ $y = 1 \text{ or } y = -3$ $C(-1;1)$ $D(1;-3)$	✓ A equating ✓ A std. form ✓ CA factors ✓ CA both values of x ✓ CA both values of y (5)
5.1.5 a)	$x \in \mathbb{R} ; x \neq 0$ OR $x > 0 \text{ or } x < 0$ OR $x \in (-\infty ; 0) \text{ or } x \in (0 ; \infty)$	✓ A ✓ A ✓ A (1)
5.1.5b)	$x < -2 \text{ or } -\frac{1}{2} \leq x < 0$ OR $x \in (-\infty; -2) \text{ or } x \in \left[-\frac{1}{2}; 0\right)$	✓ CA ✓ CA ✓ A (3) OR ✓ CA ✓ CA ✓ A (3)
5.1.6	- Reflected about the y – axis or line $x = 0$. - Shifted or translated 3 units up.	✓ A ✓ A (2)
5.2		✓ A shape (decreasing function) ✓ A both intercepts with the axes < 0 ✓ A horizontal asymptote < 0 (3)

	OR  OR 	✓ A shape (decreasing function) ✓ A point of origin ✓ A horizontal asymptote < 0 A shape (decreasing function) ✓ A both intercepts with the axes ✓ A horizontal asymptote < 0
[22]		

QUESTION 6

6.1	$0 = -2x^2 + 8$ $0 = x^2 - 4$ $(x+2)(x-2) = 0$ $x = -2 \text{ or } x = 2$	✓ A factors or square root on both sides ✓ A (both values of x) (2)
6.2		✓ A turning point ✓ CA both x – intercepts ✓ A shape (concave down) (3)
6.3	$k > 8 \text{ or } k \in (8; \infty)$	✓ CA (from the graph in 6.2) (1)
6.4	Max value of $m = 8$ $8 - 5 = 3$ 3^3 $\therefore$ The maximum value is 27.	✓ A 3 ✓ A answer (2)
[8]		

QUESTION 7

7.1.1	$P(D \text{ and } K) = P(D) + P(K) - P(D \text{ or } K)$ $= 0,25 + 0,5 - 0,625$ $= 0,125$	✓ A substitution ✓ CA answer (2)
7.1.2	No, - Events are not mutually exclusive / $P(A \text{ and } B) \neq 0$ OR - events are not exhaustive / $P(A) + P(B) = 1$	✓ A ✓ A reason (2)
7.2.1		✓ A x on the intersection ✓ A both $42 - x$ & $35 - x$ ✓ A 38 (3)
7.2.2	$42 - x + x + 35 - x + 38 = 100$ $x = 15$	✓ A equating ✓ CA answer (2)
7.2.3	a) $\frac{38}{100}$ or $\frac{19}{50}$ Accept: 0,38	✓ A (1)
	b) $\frac{62}{100}$ or $\frac{31}{50}$ Accept: 0,62	✓ A (1)
	c) $\frac{27}{100}$ Accept: 0,27	✓ A (1)
		[12]

TOTAL: 100 MARKS