



education

**MPUMALANGA PROVINCE
REPUBLIC OF SOUTH AFRICA**

**NATIONAL
SENIOR CERTIFICATE**



GRADE 12

MATHEMATICS PAPER 1

JUNE 2022

**MARKS: 150
TIME: 3 hours**

[Stanmorephysics.com](https://stanmorephysics.com)

This question paper consists of 9 pages and a one-page information sheet

INSTRUCTIONS AND INFORMATION

Read the following instructions carefully before answering the questions.

1. This question paper consists of **11** questions.
Answer ALL the questions.
2. Show clearly ALL the calculations, diagrams, graphs, etcetera, which you have used in determining the answers
3. An approved scientific calculator (non-programmable and non-graphical) may be used, unless stated otherwise.
4. If necessary, answers should be rounded off to TWO decimal places, unless stated otherwise.
5. Answers only will not necessarily be awarded full marks.
6. Number the answers correctly according to the numbering system used in this question paper.
7. Diagrams and graphs are NOT necessarily drawn to scale.
8. An information sheet with formulae is included at the end of the question paper.
9. Write neatly and legibly.

QUESTION 11.1 Solve for x .

1.1.1 $-(1-x)(x+2) = 0$ (3)

1.1.2 $2x^2 = -5x + 4$ (correct to TWO decimal places) (4)

1.1.3 $-x^2 - x + 6 \geq 0$ (4)

1.1.4 $\sqrt{x+2} = x$ (4)

1.2 Given $9^{x+2} \cdot 27^{y+1} = 3^{1-x}$ and $x^2 + y^2 + xy = 7$

1.2.1 Show that $y = -x - 2$ (3)

1.2.2 Hence, solve for x and y simultaneously (5)

1.3 Prove that the roots of $x^2 = 1 - px$ are real for all values of x . (3)1.4 If $x + \frac{1}{x} = 10$, $x > 0$, determine without solving the equation, the value (3)

of $x^2 + \frac{1}{x^2}$

[29]**QUESTION 2**2.1 Consider the following sequence: $\frac{1}{2}; 5; \frac{1}{4}; 9; \frac{1}{8}; 13; \dots$

2.1.1 If the pattern continues, write down the next two terms. (2)

2.1.2 Calculate the sum of the first 250 terms of the above sequence. (6)

2.1.3 Find the 80th term of the sequence. (3)2.2 If the general term of the quadratic sequence 1; x ; 17; y ; 49; ... is

$T_n = 2n^2 + bn + c$, find the value of x and y . (5)

[16]

QUESTION 3

- 3.1 For which values of x will the series (3)
 $(3x - 4)^3 + (3x - 4)^4 + (3x - 4)^5 + \dots$ be a converging series?

- 3.2 Evaluate $\sum_{k=3}^{k=20} 2(3)^{k-1}$ (4)

[7]

QUESTION 4

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

- 4.1 Express the function in the form (1)

$$f(x) = \frac{a}{x - p} + q$$

- 4.2 Write down the equation of the asymptotes. (2)

- 4.3 Write down the range of f . (1)

- 4.4 Determine:

4.4.1 the y - intercept (1)

4.4.2 the x - intercept (2)

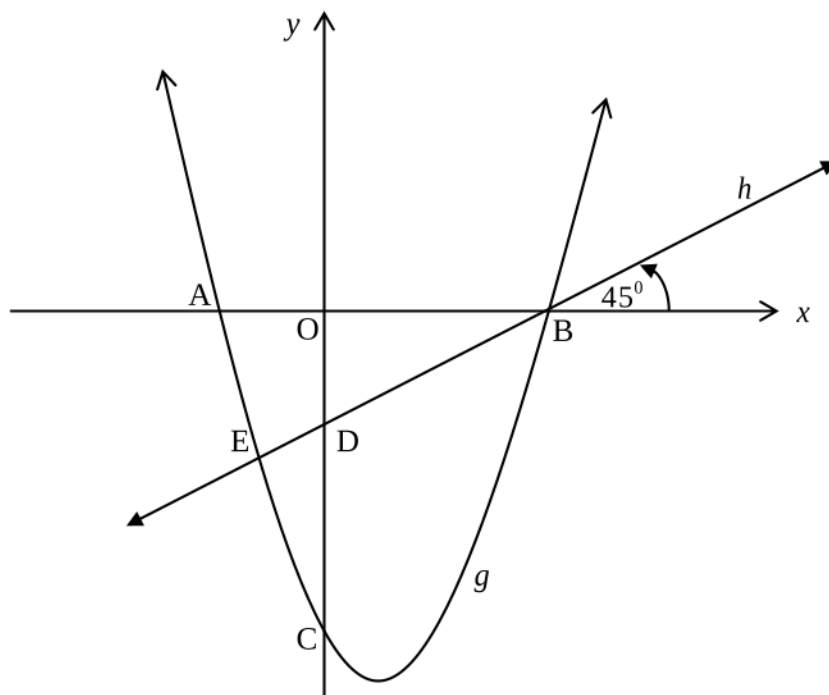
- 4.5 Sketch the graph of the function showing clearly the asymptotes and the intercepts with the axes. (3)

- 4.6 If another function g is defined as $g(x) = f(x - 2) + 5$, determine the coordinates of the point of intersection of the asymptotes of g . (2)

[12]

QUESTION 5

The sketch below shows the graph of $g(x) = x^2 - x - 6$ and $h(x) = ax + q$. The graphs intersect at B and E. The graph of g intersects the x -axis at A and B and has a y intercept at C. The graph of h makes an angle of 45° with the x axis.

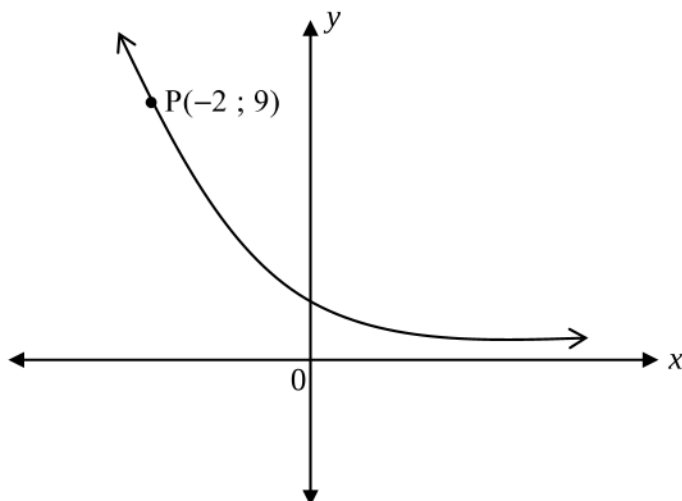


- 5.1 Determine the coordinates of B and C. (4)
- 5.2 Calculate the value of a , the gradient of the function h . (2)
- 5.3 Determine the coordinates of D (2)
- 5.4 Calculate the length of CD (1)
- 5.5 Determine the equation of a line perpendicular to h and passing through B. (3)
- 5.6 Determine the value(s) of x for which $g(x) \cdot g'(x) > 0$ (3)

[15]

QUESTION 6

The graph of $f(x) = a^x$ passes through $P(-2 ; 9)$.



- 6.1 Determine the value of a . (3)
- 6.2 Write down the equation of f^{-1} , the inverse of f in the form $y = \dots$ (2)
- 6.3 Sketch the graphs of f and f^{-1} on the same system of axes. Show at least one point on f^{-1} and indicate the line of reflection. (3)
- 6.4 Write down the domain of the f^{-1} . (1)
- 6.5 Write down the equation of $g(x) = f(-x)$. (2)
- 6.6 Determine the values of x for which $f^{-1}(x) > -2$. (3)

[14]

QUESTION 7

- 7.1 When John purchased his new car, the bank offered him a loan at a nominal rate of 13% p.a. compounded monthly. What was the effective annual interest rate that he was required to pay? (3)
- 7.2 How many years will it take for an article to depreciate to half its value according to the reducing-balance method at 7% per annum. Give your answer in months (4)
- 7.3 Thandi needs to save money to buy a cellphone at the end of 7 years. She already has R3000.00 invested in a bank account. Two years after her first deposit of R3000.00, her mother gave her R4000.00 to add to her investment. The interest rate for the first 3 years is 7% per annum compounded quarterly but then changes to 12% per annum compounded every 6 months. Will she have enough money at the end of the 7 year period to buy a cellphone worth R12 000.00? Show all your calculations. (6)
- [13]**

QUESTION 8

- 8.1 Given $f(x) = -\frac{2}{x}$, determine $f'(x)$ from first principles. (5)
- 8.2 Determine:
- 8.2.1 $f'(x)$ if $f(x) = \frac{1}{2}x^2 - \frac{3x}{10}$ (2)
- 8.2.2 $D_x \left[2\sqrt{x^3} + \frac{1}{3x} \right]$ (4)
- 8.2.3 $\frac{dy}{da}$ if $y = 3x^3a^4 + a^5x$. (2)
- [13]**

QUESTION 9

The following information is about a cubic polynomial $y = f(x)$.

- $f(-1) = 0$
- $f(5) = 0$
- $f(0) = -2$
- $f'(-1) = f'(3) = 0$
- $f(3) = -6$
- If $x < -1$ then $f'(x) > 0$
- If $x > 3$ then $f'(x) > 0$

- 9.1 Sketch a neat graph $f(x)$ showing all intercepts and turning points. (5)
- 9.2 Use the graph to find the x value of the point of inflection. (2)
- 9.3 For which values of x is the graph decreasing? (2)
- [9]**

QUESTION 10

A stone is thrown upwards. Its height (in metres) above the ground at t seconds is given by $h(t) = -t^2 + 6t + 16$.

- 10.1 Determine the initial height of the stone above the ground. (1)
- 10.2 Determine the time taken to reach the maximum height. (3)
- 10.3 Determine the acceleration of the stone. (1)
- 10.4 How fast was the stone travelling when it hit the ground? (4)
- [9]**

QUESTION 11

11.1 Events A and B are independent .Given that

- $P(A \text{ only}) = 0.4$
- $P(A \text{ and } B) = 0.3$
- $P(B \text{ only}) = x$
- $P(\text{not } (A \text{ or } B)) = y$

11.1.1 Are events A and B mutually exclusive? Justify your answer. (2)

11.1.2 Calculate $P(A \text{ and } B)'$ (2)

11.1.3 Determine the values of x and y . (4)

11.2 The probability that a certain soccer team has all its players fit to play is 70%.The probability that they will win a game if all their players are fit is 90%. When they are not fit the probability of them winning becomes 45%.

11.2.1 Draw a tree diagram to show the possibilities (3)

11.2.2 Calculate the probability of them winning their next game (2)

[13]

TOTAL: 150

INFORMATION SHEET

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

$$y = mx + c$$

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

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

$$m = \tan \theta$$

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

$$\text{In } \triangle ABC : \frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

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

$$\text{Area of } \triangle ABC = \frac{1}{2}ab \cdot \sin C$$

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

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

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

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

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

$$\sin 2A = 2\sin A \cdot \cos A$$

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

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

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

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

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

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



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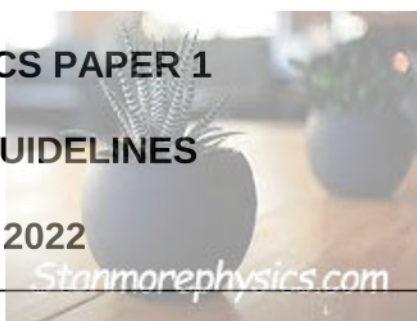
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GRADE 12

MATHEMATICS PAPER 1

MARKING GUIDELINES

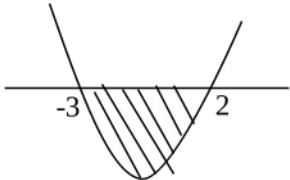
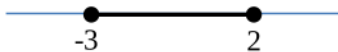
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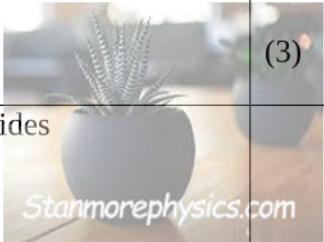
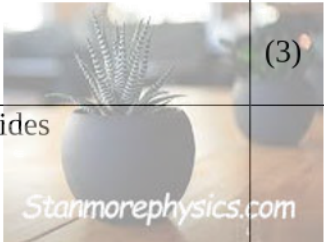


**MARKS: 150
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This marking guideline consists of 10 pages.

QUESTION 1

1.1.1	$-(1-x)(x+2) = 0$ $(1-x)(x+2) = 0$ $1-x = 0$ or $x+2 = 0$ $x = 1$ or $x = -2$	✓ multiply by negative ✓ $x = 1$ ✓ $x = -2$	(3)
1.1.2	$2x^2 = -5x + 4$ $2x^2 + 5x - 4 = 0$ $x = \frac{-5 \pm \sqrt{(5)^2 - 4(2)(-4)}}{2(2)}$ $x = \frac{-5 \pm \sqrt{57}}{4}$ $x = -3.14$ or $x = 0.64$	✓ standard form ✓ substitution in correct formula ✓ $\sqrt{57}$ ✓ both values	(4)
1.1.3	$-x^2 - x + 6 \geq 0$ $x^2 + x - 6 \leq 0$ $(x+3)(x-2) \leq 0$  or  $-3 \leq x \leq 2$	✓ inequality ✓ critical values ✓ $-3 \leq x \leq 2$	(4)
1.1.4	$(\sqrt{x+2})^2 = (x)^2$ $x+2 = x^2$ $x^2 - x - 2 = 0$ $(x-2)(x+1) = 0$ $x = 2$ or $x = -1$	✓ squaring both side ✓ standard form ✓ factorisation ✓ x- values	(4)
1.2.1	$9^{x+2} \cdot 27^{y+1} = 3^{1-x}$ $3^{2(x+2)} \cdot 3^{3(y+1)} = 3^{1-x}$ $3^{2x+4+3y+3} = 3^{1-x}$ $3x + 3y = -6$ $y = -x - 2$	✓ exponential law ✓ exponential law ✓ $3x + 3y = -6$	(3)
1.2.2	$(-y-2)^2 + y^2 + y(-y-2) = 7$ $y^2 + 4y + 4 + y^2 - y^2 - 2y = 7$ $y^2 + 2y - 3 = 0$ $(y+3)(y-1) = 0$ $y = -3$ or $y = 1$ $x = 1$ or $x = -3$	✓ substitution ✓ standard form ✓ factors ✓ both y values ✓ both x values.	(5)

1.3	$x^2 + px - 1 = 0$ $b^2 - 4ac = p^2 - 4(1)(-1)$ $b^2 - 4ac = p^2 + 4$ $\Delta > 0$ for real values of x .	✓ standard form ✓ substitution in discriminant ✓ conclusion	 (3)
1.4	$\left(x + \frac{1}{x}\right)^2 = 10^2$ $x^2 + 2 + \frac{1}{x^2} = 100$ $x^2 + \frac{1}{x^2} = 100 - 2$ $x^2 + \frac{1}{x^2} = 98$	✓ square both sides ✓ simplification ✓ answer	 (3)
			[29]

QUESTION 2

2.1.1	$\frac{1}{16}, 17$	✓ $\frac{1}{16}$ ✓ 17	(2)
2.1.2	$\frac{1}{2}, \frac{1}{4}, \frac{1}{8} \dots$ $a = \frac{1}{2}, r = \frac{1}{2}, n = 125$ $S_{125} = \frac{0.5(1 - 0.5^{125})}{1 - 0.5}$ $= 1$ For arithmetic sequence 5, 9, 13.. $a = 5, d = 4, n = 125$ $S_{125} = \frac{125}{2}[2(5) + (125 - 1)4]$ $= 31625$ $S_{125} + S_{125} = 1 + 31625$ $= 31626$	✓ a, r and n ✓ substitution in correct formula ✓ $S_{125} = 1$ ✓ substitution in correct formula ✓ $S_{125} = 31625$ ✓ 31626	(6)
2.1.3	$T_n = 5 + (n - 1)(4)$ $= 4n + 1$ $T_{80} = 4(80) + 1$ $= 321$	✓ substitution ✓ $4n + 1$ ✓ 321	(3)
2.2.2		✓ first difference	

$ \begin{array}{cccc} x-1 & 17-x & y-17 & 49-y \\ & \diagdown & \diagup & \diagdown \\ & & & \\ 17-x-(x-1) & y-17-(17-x) & 49-y-(y-17) & \\ 18-2x & y+x-34 & 66-2y & \\ a=2 & & & \\ \therefore 2a=4 & & & \\ \therefore 18-2x=4 \text{ or } y+x-34=4 & & & \\ x=7 & & & \\ \therefore y+7-34=4 & & & \\ y=31 & & & \end{array} $	<p>✓second difference</p> <p>✓ $18-2x=4$</p> <p>✓ $x=7$</p> <p>✓ $y=31$</p>	(5)
		[16]

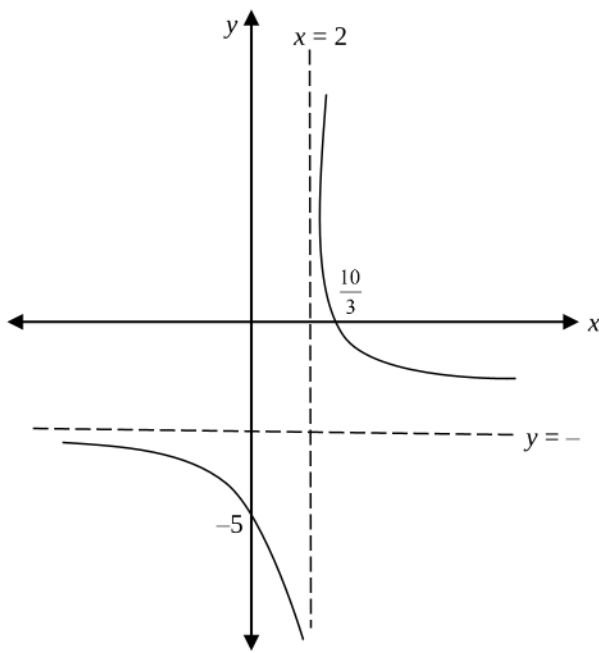
QUESTION 3

3.1	$r = \frac{(3x-4)^4}{(3x-4)^3} = (3x-4)$ $-1 < 3x-4 < 1$ $1 < x < \frac{5}{3}$	✓ value of r ✓ $-1 < 3x-4 < 1$ ✓ condition	(3)
3.2	$\sum_{k=3}^{20} 2(3)^{k-1} = 2(3)^2 + 2(3)^3 + 2(3)^4 + \dots + 2(3)^{19}$ $= 18 + 54 + 162 + \dots$ $n = 20 - 3 + 1 = 18$ $r = \frac{2(3)^3}{2(3)^2} = 3$ $S_{18} = \frac{18(3^{18} - 1)}{3 - 1} = 3496794392$	✓ value of n ✓ value of r ✓ substitution into correct formula ✓ answer	(4)
			[7]



QUESTION 4

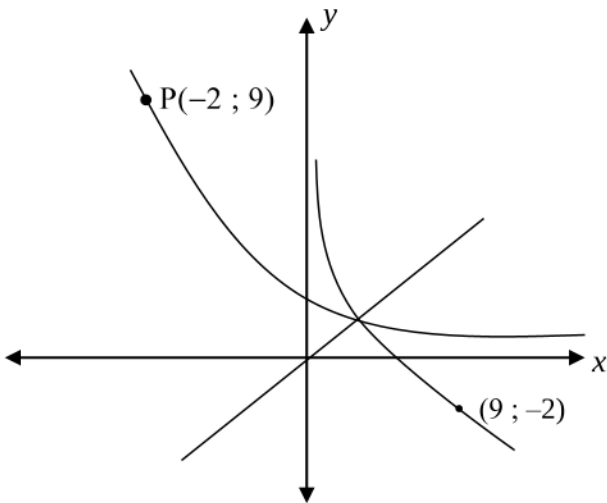
4.1	$y = \frac{4}{x-2} - 3$ $\therefore f(x) = \frac{4}{x-2} - 3$	✓ value of $f(x)$	(1)
4.2	$x = 2$ $y = -3$	✓ $x = 2$ ✓ $y = -3$	(2)
4.3	$y \in R; y \neq -3$	✓ answer	(1)

4.4.1	For y-intercept, $x = 0$ $y = \frac{4}{-2} - 3$ $= -5$	✓ y - value	(1)
4.4.2	For x-intercept, $y = 0$ $0 = \frac{4}{x-2} - 3$ $x = \frac{10}{3}$	✓ $y = 0$ ✓ x value	(2)
4.5		✓ asymptotes ✓ intercepts ✓ shape	(3)
4.6	(4 ; 2)	✓ $x = 4$ ✓ $y = 2$	(2)
			[12]

QUESTION 5

5.1	$(x - 3)(x + 2) = 0$ $x = 3$ or $x = -2$ $B(3 ; 0)$ $C(0 ; -6)$	✓ factors ✓ both x values ✓ $B(3 ; 0)$ ✓ $C(0 ; -6)$	(4)
5.2	$a = \tan 45^\circ$ $= 1$	✓ $a = \tan 45^\circ$ ✓ answer	(2)
5.3	$\frac{y - 0}{0 - 3} = 1$ $y = -3$ $(0 ; -3)$ OR $y = ax + q$ $0 = (1)(3) + q$ $q = -3$	$\frac{y - 0}{0 - 3} = 1$ ✓ $\frac{y - 0}{0 - 3} = 1$ ✓ $(0 ; -3)$ ✓ substitution ✓ value of q	(2)
5.4	$CD = -3 - (-6) = 3$	✓ $CD = 3$	(1)
5.5	$m = -1$; lines are perpendicular. $y = -x + c$ $0 = -3 + c$ $c = 3$ $y = -x + 3$	✓ $m = -1$ ✓ substitution of $(3;0)$ ✓ equation	(3)
5.6	$-2 < x < \frac{1}{2}$ or $x > 3$	✓ $x = \frac{1}{2}$ ✓ $-2 < x < \frac{1}{2}$ ✓ $x > 3$	(3)
			[15]


QUESTION 6

6.1	$9 = a^{-2}$ $a^2 = \frac{1}{9}$ $a = \pm \frac{1}{3}$ $\therefore a = \frac{1}{3}$	✓ substituting values of x and y ✓ $a = \pm \frac{1}{3}$ ✓ $a = \frac{1}{3}$	(3)
6.2	$y = \left(\frac{1}{3}\right)^x$ $x = \left(\frac{1}{3}\right)^y$ $y = \log_{\frac{1}{3}} x$	✓ interchange x and y ✓ answer	(2)
6.3		✓ $y = x$ ✓ shape of f^{-1} ✓ $(9; -2)$ on f^{-1}	(3)
6.4	$x > 0, x \in \mathbb{R}$	✓ answer	(1)
6.5	$g(x) = f(-x)$ $g(x) = \left(\frac{1}{3}\right)^{-x}$ $g(x) = 3^x$	✓ substitution of $-x$ ✓ $g(x) = 3^x$	(2)
6.6	$\log_{\frac{1}{3}} = -2$ $x = \left(\frac{1}{3}\right)^{-2}$ $x = 9$ $0 < x < 9$	✓ equating to -2 ✓ $x = 9$ ✓ inequality	(3)
			[14]

QUESTION 7

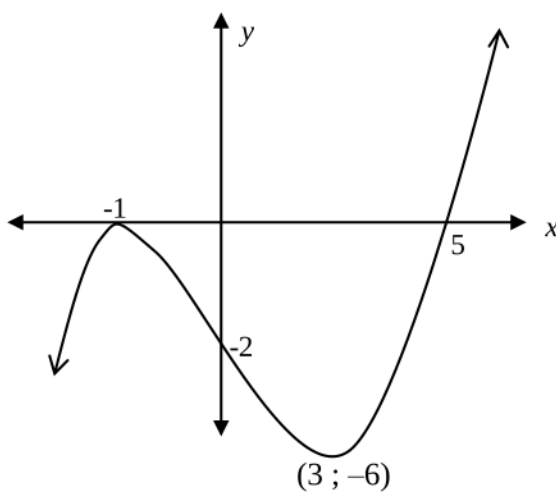
7.1	$i_{\text{eff}} = \left(1 + \frac{0.13}{12}\right)^{12} - 1$ $= 0.1380324816$ $r = 13.80\%$	✓ substitution ✓ i ✓ 13;80%	(3)
7.2	$A = P(1-i)^n$ $\frac{1}{2}x = x(1-0.07)^n$ $\frac{1}{2} = (0.93)^n$ $n = \log_{0.93} \frac{1}{2}$ $n = 9,55\dots$ $n = 9 \text{ years } 6 \text{ month}$ $n = 115 \text{ months}$	✓ $P = \frac{1}{2}A$ ✓ substitution into correct formula ✓ correct use of logs ✓ answer in months	(4)
7.3.	$= 3000 \left(1 + \frac{0,07}{4}\right)^{4 \times 3} \left(1 + \frac{0,12}{2}\right)^{2 \times 4} +$ $4000 \left(1 + \frac{0.07}{4}\right)^{4 \times 1} \left(1 + \frac{0,12}{2}\right)^{2 \times 4}$ $= R12721,70$ <p>Yes she will be able to afford</p>	✓ $3000 \left(1 + \frac{0,07}{4}\right)^{4 \times 3}$ ✓ $\left(1 + \frac{0,12}{2}\right)^{2 \times 4}$ ✓ $4000 \left(1 + \frac{0.07}{4}\right)^{4 \times 1}$ ✓ $\left(1 + \frac{0,12}{2}\right)^{2 \times 4}$ ✓ answer ✓ conclusion	(6)
			[13]

QUESTION 8

8.1	$f(x+h) = \frac{-2}{x+h}$ $f'(x) = \lim_{h \rightarrow 0} \left(\frac{-\frac{2}{x+h} - \left(-\frac{2}{x}\right)}{h} \right)$ $= \lim_{h \rightarrow 0} \frac{-2x + 2x + 2h}{x(x+h)} \times \frac{1}{h}$ $= \lim_{h \rightarrow 0} \frac{2h}{x(x+h)} \times \frac{1}{h}$ 	✓ $f(x+h)$ ✓ substitution into correct formula ✓ $\frac{-2x + 2x + 2h}{x(x+h)} \times \frac{1}{h}$ ✓ $\frac{2}{x(x+h)}$ ✓ answer	
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	$= \lim_{x \rightarrow 0} \frac{2}{x(x+h)}$ $= \frac{2}{x^2}$		(5)
8.2.1	$f'(x) = x - \frac{3}{10}$	$\checkmark x$ $\checkmark -\frac{3}{10}$	(2)
8.2.2	$= D_x \left[2x^{\frac{3}{2}} + \frac{1}{3}x^{-1} \right]$ $= 3x^{\frac{1}{2}} - \frac{1}{3}x^{-2}$	$\checkmark 2x^{\frac{3}{2}}$ $\checkmark \frac{1}{3}x^{-1}$ $\checkmark 3x^{\frac{1}{2}}$ $\checkmark -\frac{1}{3}x^{-2}$ <div style="border: 1px solid black; padding: 2px; display: inline-block;">Penalize 1 mark for notation</div>	(4)
8.2.3	$\frac{dy}{da} = 12x^3a^3 + 5xa^4$	$\checkmark 12x^3a^3$ $\checkmark 5xa^4$	(2)
			[13]

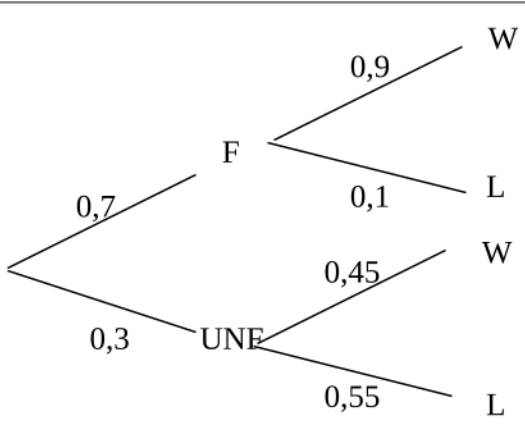
QUESTION 9

9.1.1		\checkmark shape $\checkmark \checkmark$ x-intercepts $(-1 ; 0)$ and $(5 ; 0)$ \checkmark y-intercept $(0 ; -2)$ \checkmark minimum turning point at $(3 ; -6)$	(5)
9.1.2	Point of inflection $= \frac{-1+5}{2}$ $= 2$	\checkmark substitution \checkmark answer	(2)
9.1.3	Increasing for $-1 < x < 3$	$\checkmark \checkmark$ answer	(2)
			[9]

QUESTION 10

10.1	$h(0) = -(0)^2 + 6(0) + 16 = 16m$	✓16m	(1)
10.2	$h'(t) = -2t + 6$ $2t + 6 = 0$ $t = 3$	✓derivative ✓ $h'(t) = 0$ ✓answer	(3)
10.3	$h'(t) = -2t + 6$ $h''(t) = -2m/s^2$	✓second derivative	(1)
10.4	$0 = -t^2 + 6t + 16$ $t^2 - 6t - 16 = 0$ $(t - 8)(t + 2) = 0$ $t = 8 \text{ or } t = -2$ $\therefore t = 8$ $h'(8) = -2(8) + 6$ $= -16 \text{ m/s}$	✓equating to zero ✓factors ✓ $t = 8$ ✓substitution of 8 in the correct equation	(4)
			[9]

QUESTION 11

11.1.1	No, $P(A \text{ and } B) \neq 0$	✓No ✓conclusion	(2)
11.1.2	$P(A \text{ and } B)' = 0,4 + x + y$	✓✓ answer	(2)
11.1.3	$P(A \text{ and } B) = P(A) \times P(B)$ $0,3 = (0,7)(0,3 + x)$ $0,3 = 0,21 + 0,7x$ $x = 0,128571$ $x = 0,13$ $y = 1 - (0,4 + 0,3 + 0,13)$ $y = 0,17$	✓formula ✓substitution in correct formula ✓ $x = 0,13$ ✓ $y = 0,17$	(4)
11.2.1		✓✓✓ for each branch	(3)
11.2.2	$0,9 \times 0,7 + 0,3 \times 0,45 = 0,765$	✓method ✓answer	(2)
			[13]

TOTAL: 150