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KWAZULU-NATAL PROVINCE

EDUCATION
REPUBLIC OF SOUTH AFRICA

PROVINCIAL STANDARDISED ASSESSMENT

GRADE 11

MATHEMATICS P1

NOVEMBER 2026

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MARKS: 150

TIME: 3 hours

This question paper consists of 8 pages, 1 information sheet and an answer book of 20 pages.

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INSTRUCTIONS AND INFORMATION

Read the following instructions and information carefully before answering the questions.

1. This question paper consists of 9 questions.
2. Answer ALL the questions in the SPECIAL ANSWER BOOK provided.
3. Clearly show ALL calculations, diagrams, graphs, etc. that you have used in determining your answers.
4. Answers only will NOT necessarily be awarded full marks.
5. You may use an approved scientific calculator (non-programmable and non-graphical), unless stated otherwise.
6. If necessary, round off answers correct to TWO decimal places, unless stated otherwise.
7. Diagrams 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.

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QUESTION 1

1.1 Solve for x:

1.1.1 $(5x+2)(x-1)=0$ (2)

1.1.2 $5x^2-8x=7$ (correct to TWO decimal places) (4)

1.1.3 $(x-3)(x+7)+9\leq 0$ (4)

1.1.4 $\sqrt{5+x}-3=x$ (5)

1.1.5 $x^{\frac{2}{3}}-4x^{\frac{1}{3}}-32=0$ (4)

1.2 Solve for x and y simultaneously.
$-x+y=-1$ and $xy-2y^2=x^2+3x-10$ (6)

1.3 The roots of a quadratic equation, in terms of p, are:
$$x=\frac{(12+p)\pm\sqrt{(-12-p)^2-4(1)(12p+1)}}{2}.$$
Calculate the values of p for which the roots of the equation will be equal. (4)
[29]

QUESTION 2

2.1 Simplify fully, **WITHOUT** using a calculator.

2.1.1 $\sqrt[3]{\sqrt{71}-\sqrt{7}}\times\sqrt[3]{\sqrt{71}+\sqrt{7}}$ (3)

2.1.2 $\dfrac{2^{4x+1}.9^x.6^{2x-1}}{12^{3x}.3^x}$ (4)

2.2 Solve for x, **WITHOUT** using a calculator.

2.2.1 $9\sqrt[3]{x^{-2}}-4=0$ (3)

2.2.2 $\left(3x^2\right)^2-54x^2=\sqrt[3]{27x^{12}}$ (5)
[15]

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QUESTION 3

Consider the linear pattern: $4p+5\ ;\ 10-p\ ;\ 3p-12\ ;\ \ldots\ ;-303$

3.1 Show that the first three terms of the above linear pattern are: $17\ ;\ 7\ ;\ -3$. (4)

3.2 Determine the n^{th} term (general term) of the linear pattern in the form $T_n = an+b$. (2)

3.3 Calculate the value of the 21^{st} term (T_{21}). (2)

3.4 Tom is required to select a term from the above linear pattern at random. Calculate the probability that Tom will select a term that has a negative value. (3)

[11]

QUESTION 4

Consider the quadratic number pattern: $220\ ;\ 400\ ;\ 540\ ;\ 640\ ;\ \ldots$

4.1 Show that the general term of this number pattern is given by $T_n = -20n^2 + 240n$ (3)

4.2 Between which two consecutive terms of the quadratic number pattern is there a difference of -180? (4)

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4.3 What number must be added to T_{n-1} so that $T_n = -62\ 000$? (4)

[11]

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QUESTION 5

5.1 Consider the function of $f(x)=ax^2+bx-2$ which passes through the points $(-2\,;9)$ and $(6\,;13)$.

5.1.1 Write down the y-intercept of f. (1)

5.1.2 Prove that $a=1$ and $b=-\frac{7}{2}$ (4)

5.1.3 Calculate the x-intercepts of f. (3)

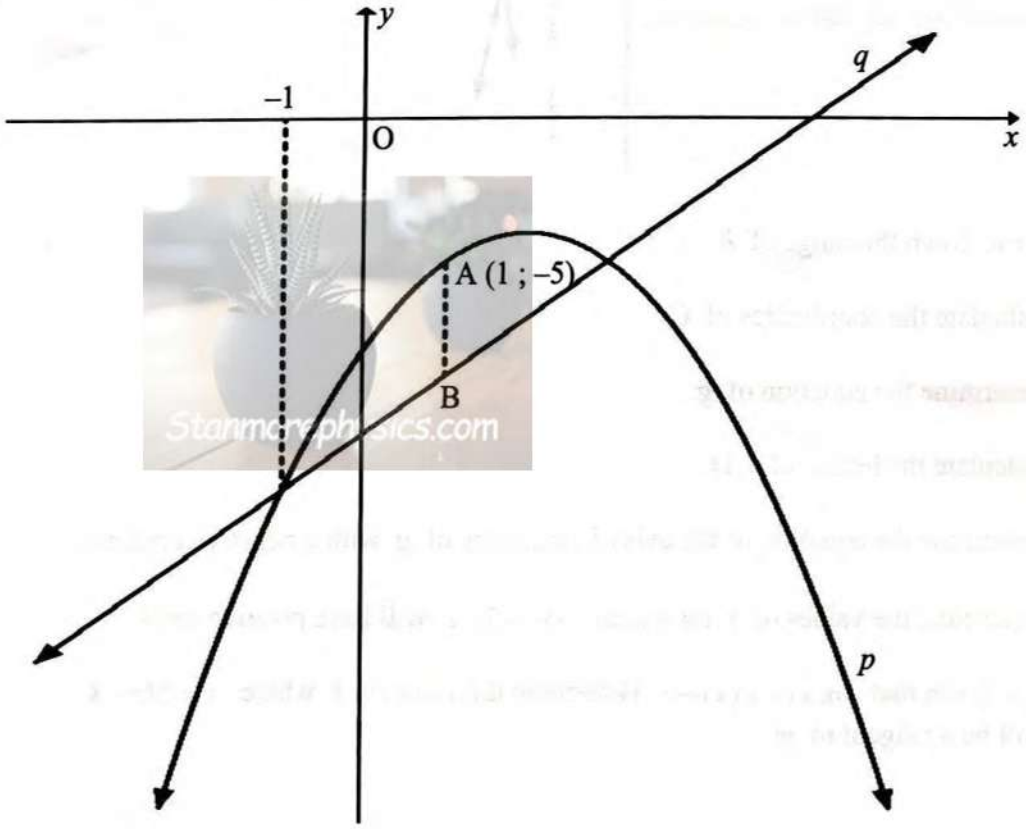
5.1.4 Calculate the coordinates of the turning point of f. (3)

5.1.5 Draw a neat sketch of f. Clearly label the intercepts with the axes and the turning point. (3)

5.1.6 It is given that $h(x)=x^2-\frac{15}{2}x+10$.
Explain, **in words,** the transformation from f to h. (3)

5.2 Consider the graphs of $p(x)=-(x-2)^2-4$ and $q(x)=mx+c$. Graphs p and q intersect at $x=-1$. $A(1\,;-5)$ and B lie on p and q respectively such that AB is parallel to the y-axis and AB = 4 units.

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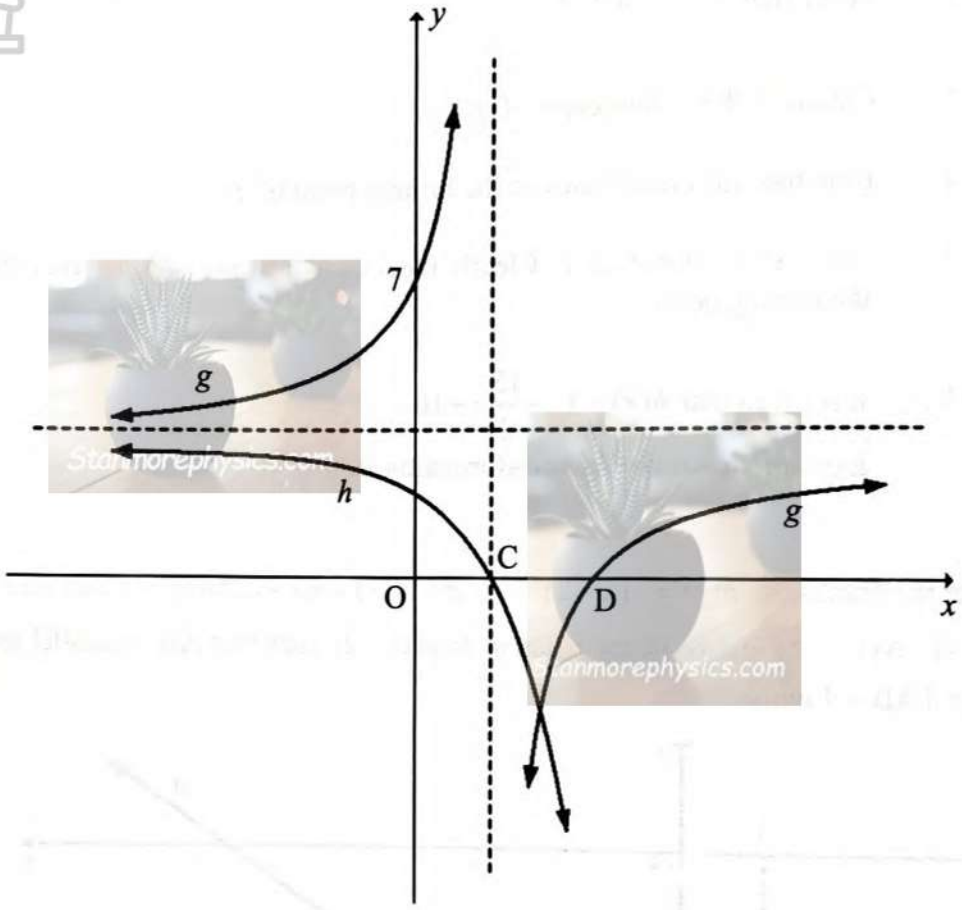
Calculate the values of x for which $p(x)<q(x)$. (7)

[24]

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QUESTION 6

The graphs of $g(x)=\frac{a}{x+p}+q$ and $h(x)=-3^x+3$ are shown below. Points C and D are the x-intercepts of h and g respectively. The y-intercept of g is 7 and the vertical asymptote of g passes through C. Graphs g and h have the same horizontal asymptote.



6.1 Write down the range of h. (1)

6.2 Calculate the coordinates of C. (2)

6.3 Determine the equation of g. (4)

6.4 Calculate the length of CD. (3)

6.5 Determine the equation of the axis of symmetry of g with a negative gradient (2)

6.6 Determine the values of t for which $-3^x+5=t$ will have positive roots. (3)

6.7 It is given that $m(x)=g(x)-3$. Determine the value of k where $y=5kx-k$ will be a tangent to m. (7)

[22]

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QUESTION 7

7.1 An investment earns interest at the rate of 18% per annum, compounded monthly. Calculate the annual effective rate of interest of this investment. (3)

7.2 An ambulance was bought for R725 000. The value of the ambulance depreciates annually at the rate of 10,5% p.a. on the reducing balance method. Calculate the book value of the ambulance 60 months after it was bought. (3)

7.3 Mr Sangweni deposited an unknown amount in an account that paid interest at the rate of r% p.a., compounded monthly. After 4 years, the accumulated amount in the account was three times the original deposit. Calculate the value of r. (4)

7.4 Mrs Pillay planned a holiday to Zanzibar 6 years ago.

- She invested R75 000 into an account that paid interest at 15% p.a., compounded quarterly for the first 4 years.
- She made a withdrawal of R5 000 to pay for her daughter's matric dance, from the account 4 years after the initial investment.
- At the end of 4 years, the interest rate changed to 12% p.a., compounded half-yearly.
- The total cost of the holiday is now R165 000.

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Will Mrs Pillay have sufficient money in the investment to pay for the holiday now? (5)
[15]

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QUESTION 8

8.1 A and B are two events such that $P(A)=0,5$, $P(B)=0,4$ and $P[\text{not}(A \text{ or } B)]=\frac{3}{20}$.

8.1.1 Calculate $P(A \text{ or } B)$ (2)

8.1.2 Are events A and B mutually exclusive? Justify your answer with a calculation. (3)

8.1.3 Draw a Venn diagram to represent the above information. (3)

8.1.4 Calculate $P[\text{not A or (A and not B)}]$ (2)

8.2 A Hospitality Studies teacher conducted a survey with all the grade 10 and 11 learners at a school about their preference of sandwich. The results are shown in the table below.

	Cheese sandwich	**Chicken Mayo sandwich**	**Total**
Grade 10		18	200
Grade 11		4	
Total			

8.2.1 The probability of randomly selecting a grade 11 learner from among all the grade 10 and 11 learners is $\frac{1}{5}$. Calculate the total number of grade 10 and 11 learners. (2)

8.2.2 Are the events of being a grade 10 learner and preferring a chicken mayo sandwich independent? Justify your answer with calculations. (4)

[16]

QUESTION 9

Two bags contain identical white and red marbles.

- Bag A contains $2x$ white marbles and 8 red marbles.
- Bag B contains $(x-1)$ white marbles and 10 red marbles.
- There is an equal chance of choosing Bag A or Bag B.
- Mrs Phewa chooses a bag and picks a marble at random from it.
- The product of the probabilities of picking a white marble from each bag is 5%.

Calculate the probability of Mrs Phewa picking a red marble from Bag B. (7)

[7]

TOTAL: [150]

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INFORMATION SHEET

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

$$A = P(1+ni) \qquad A = P(1-ni) \qquad A = P(1-i)^n \qquad A = P(1+i)^n$$

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

$$T_n = ar^{n-1} \qquad S_n = \frac{a(r^n - 1)}{r-1} \;; r \neq 1 \qquad S_\infty = \frac{a}{1-r} \;; -1 < r < 1$$

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

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

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2} \qquad M\left(\frac{x_1 + x_2}{2}; \frac{y_1 + y_2}{2}\right)$$

$$y = mx + c \qquad y - y_1 = m(x - x_1) \qquad m = \frac{y_2 - y_1}{x_2 - x_1} \qquad m = \tan\theta$$

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

In ΔABC: $\dfrac{a}{\sin A} = \dfrac{b}{\sin B} = \dfrac{c}{\sin C}$

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

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

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

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

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

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

$$P(A) = \frac{n(A)}{n(S)} \qquad P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$$

$$\hat{y} = a + bx \qquad b = \frac{\sum (x - \bar{x})(y - \bar{y})}{\sum (x - \bar{x})^2}$$

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FINAL MARKING GUIDELINES!

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MARKING GUIDELINES

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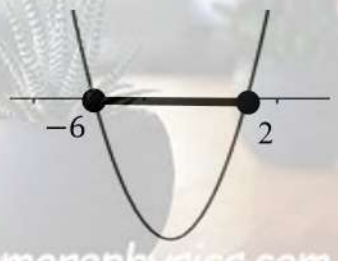
MARKS: 150

These marking guidelines consist of 18 pages.

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QUESTION 1

1.1.1	$(5x+2)(x-1)=0$ $x=-\frac{2}{5}=-0,4$ or $x=1$	✓A answer ✓A answer (2)
1.1.2	$5x^2-8x=7$ $5x^2-8x-7=0$ $x=\frac{-b\pm\sqrt{b^2-4ac}}{2a}$ $x=\frac{-(-8)\pm\sqrt{(-8)^2-4(5)(-7)}}{2(5)}$ $x=-0,63$ or $x=2,23$ **Penalise 1 mark for incorrect rounding**	✓A standard form ✓CA correct subst. into quadratic formula ✓CA answer ✓CA answer (4)
1.1.3	$(x-3)(x+7)+9\le 0$ $x^2+4x-21+9\le 0$ $x^2+4x-12\le 0$ $(x+6)(x-2)\le 0$ CVs: $x=-6$ or $x=2$  OR  $-6\le x\le 2$ **OR** $x\in[-6\ ;\ 2]$ **Final answer must be awarded 2 or 0.**	✓A standard form ✓CA critical values (**accept** if shown on a sketch **OR** number line) ✓✓CA answer (4)
1.1.4	$\sqrt{5+x}-3=x$ $\sqrt{5+x}=x+3$ $\left(\sqrt{5+x}\right)^2=(x+3)^2$ **B/D if** $\left(\sqrt{5+x}\right)^2=(x)^2+(3)^2$ $x+5=x^2+6x+9$ $x^2+5x+4=0$ $(x+4)(x+1)=0$ $x\ne -4$ or $x=-1$ **If selection is incorrect OR not done, award 4/5 marks**	✓A isolating the surd ✓A squaring on both sides ✓CA standard form ✓✓CA answers with selection (5)
1.1.5	$x^{\frac{2}{3}}-4x^{\frac{1}{3}}-32=0$ $\left(x^{\frac{1}{3}}-8\right)\left(x^{\frac{1}{3}}+4\right)=0$ $x^{\frac{1}{3}}=8$ or $x^{\frac{1}{3}}=-4$ $x=512$ or $x=-64$	✓A factors ✓CA both equations ✓CA answer ✓CA answer (4)

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1.1.5	**OR** $x^{\frac{2}{3}} - 4x^{\frac{1}{3}} - 32 = 0$ Let $x^{\frac{1}{3}} = k$ $k^2 - 4k - 32 = 0$ $(k-8)(k+4) = 0$ $k = 8$ or $k = -4$ $x^{\frac{1}{3}} = 8$ or $x^{\frac{1}{3}} = -4$ $x = 512$ or $x = -64$	**OR** ✓A factors in terms of k ✓CA both equations ✓CA answer ✓CA answer (4)
1.2	$-x + y = -1$ $xy - 2y^2 = x^2 + 3x - 10$ $y = x - 1$ $x(x-1) - 2(x-1)^2 = x^2 + 3x - 10$ $x^2 - x - 2(x^2 - 2x + 1) = x^2 + 3x - 10$ $-x^2 + 3x - 2 = x^2 + 3x - 10$ $-2x^2 + 8 = 0$ $x^2 - 4 = 0$ $(x+2)(x-2) = 0$ $x = -2$ or $x = 2$ $y = -3$ or $y = 1$ **OR** $-x + y = -1$ $xy - 2y^2 = x^2 + 3x - 10$ $x = y + 1$ $y(y+1) - 2y^2 = (y+1)^2 + 3(y+1) - 10$ $y^2 + y - 2y^2 = y^2 + 2y + 1 + 3y + 3 - 10$ $-y^2 + y = y^2 + 5y - 6$ $-2y^2 - 4y + 6 = 0$ $y^2 + 2y - 3 = 0$ $(y+3)(y-1) = 0$ $y = -3$ or $y = 1$ $x = -2$ or $x = 2$	✓A expressing y in terms of x ✓CA substitution ✓CA simplification (after removing brackets) ✓CA factors ✓CA both values of x ✓CA both values of y (6) **OR** ✓A expressing x in terms of y ✓CA substitution downloaded from Stanmorephysics.com ✓CA simplification (after removing brackets) ✓CA factors ✓CA both values of y ✓CA both values of x (6)
1.3	$\Delta = 0$ $(-12-p)^2 - 4(1)(12p+1) = 0$ $144 + 24p + p^2 - 48p - 4 = 0$ $p^2 - 24p + 140 = 0$ $(p-10)(p-14) = 0$ $p = 10$ or $p = 14$	✓A $\Delta = 0$ ✓A substituting Δ ✓CA factors ✓CA both values of p (4)
		[29]

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QUESTION 2

2.1.1	$\sqrt[3]{\sqrt{71}-\sqrt{7}} \times \sqrt[3]{\sqrt{71}+\sqrt{7}}$ $= \sqrt[3]{\left(\sqrt{71}-\sqrt{7}\right)\left(\sqrt{71}+\sqrt{7}\right)}$ $= \sqrt[3]{71-7}$ $= \sqrt[3]{64}$ $= \sqrt[3]{4^3}$ or $4^{3\times\frac{1}{3}}$ or $2^{6\times\frac{1}{3}}$ $= 4$	✓A surd law ✓A simplification: diff. of squares ✓CA answer (3)
	OR	**OR**
	$\sqrt[3]{\sqrt{71}-\sqrt{7}} \times \sqrt[3]{\sqrt{71}+\sqrt{7}}$ $= \left(\sqrt{71}-\sqrt{7}\right)^{\frac{1}{3}} . \left(\sqrt{71}+\sqrt{7}\right)^{\frac{1}{3}}$ $= \left[\left(\sqrt{71}-\sqrt{7}\right)\left(\sqrt{71}+\sqrt{7}\right)\right]^{\frac{1}{3}}$ $= [71-7]^{\frac{1}{3}}$ $= (64)^{\frac{1}{3}}$ or $4^{3\times\frac{1}{3}}$ or $2^{6\times\frac{1}{3}}$ $= 4$	✓A exponential law ✓A simplification: diff. of squares ✓CA answer (3)
2.1.2	$\frac{2^{4x+1}.9^x.6^{2x-1}}{12^{3x}.3^x}$ $= \frac{2^{4x+1}.\left(3^2\right)^x.(3.2)^{2x-1}}{\left(2^2.3\right)^{3x}.3^x}$ $= \frac{2^{4x+1}.3^{2x}.3^{2x-1}.2^{2x-1}}{2^{6x}.3^{3x}.3^x}$ $= 2^{4x+1+2x-1-6x}.3^{2x+2x-1-3x-x}$ $= 2^0.3^{-1}$ $= \frac{1}{3}$	✓A rewriting into prime bases ✓CA exponential law ✓CA simplifying exp. Law ✓CA answer (4)

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2.2.1	$9\sqrt[3]{x^{-2}}-4=0$ $\sqrt[3]{x^{-2}}=\frac{4}{9}$ $\left(\sqrt[3]{x^{-2}}\right)^3=\left(\frac{4}{9}\right)^3$ $x^{-2}=\frac{64}{729}$ $x^2=\frac{729}{64}$ $x=\pm\frac{27}{8}=\pm3\frac{3}{8}$	✓M cubing both sides after isolating ✓A isolating x^2 ✓CA both answers (3)
	OR $9\sqrt[3]{x^{-2}}-4=0$ $9x^{-\frac{2}{3}}-4=0$ $3^2.\left(x^{-\frac{1}{3}}\right)^2-2^2=0$ $\left(3x^{-\frac{1}{3}}+2\right)\left(3x^{-\frac{1}{3}}-2\right)=0$ or $(3k+2)(3k-2)=0$ $x^{-\frac{1}{3}}=-\frac{2}{3}$ or $x^{-\frac{1}{3}}=\frac{2}{3}$ $x^{-\frac{1}{3}\times(-3)}=\left(-\frac{2}{3}\right)^{-3}$ or $x^{-\frac{1}{3}\times(-3)}=\left(\frac{2}{3}\right)^{-3}$ $x=\pm\frac{27}{8}=\pm3\frac{3}{8}$	**OR** ✓A factors ✓A multiplying by -3 on both side in exponents i.e. $\times-3$ ✓CA both answers (3)
2.2.2	$\left(3x^2\right)^2-54x^2=\sqrt[3]{27x^{12}}$ $3^2x^4-54x^2=\sqrt[3]{27}.\sqrt[3]{x^{12}}$ $9x^4-54x^2=3x^4$ $6x^4-54x^2=0$ $x^4-9x^2=0$ $x^2(x^2-9)=0$ $x^2(x+3)(x-3)=0$ $x=0$ or $x=\pm3$	downloaded from Stanmorephysics.com ✓A $9x^4$ ✓A $3x^4$ ✓CA factors ✓CA $x=0$ ✓CA $x=\pm3$ (5)
		[15]

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QUESTION 3

3.1.	$4p+5\ ;\ 10-p\ ;\ 3p-12\ ;\ ...\ ;\ -303$ $-5p+5\ ;\ 4p-22$.....common difference $-5p+5=4p-22$ $-9p=-27$ $p=3$ 1st 3 terms: $4(3)+5\ ;\ 10-(3)\ ;\ 3(3)-12$ $17\ ;\ 7\ ;\ -3$ **If the value of p is NOT 3, award 2 out of 4 if using CA.**	✓A common differences ✓M equating common differ. ✓CA value of p ✓A substitution of p in ALL terms (4)
3.2	$T_n=-10n+27$	✓A $-10n$ ✓A 27 (2)
3.3	$T_{21}=-10(21)+27$ $=-183$ **Answer only, FULL marks**	✓CA substitution of $n=21$ ✓CA answer (2)
3.4	$17\ ;\ 7\ ;\ -3\ ;\ ...\ ;\ -303$ downloaded from Stanmorephysics.com $T_n=-10n+27$ $-303=-10n+27$ $10n=330$ $n=33$ **n must be a natural number for CA mark to be awarded.** There are 33 terms in the sequence of which 31 are negative $\text{P(neg only)}=\frac{31}{33}$ or 0,94 or 93,94% **OR** $-3\ ;\ -13\ ;\ -23\ ;...\ ;\ -303$ $T_n=-10n+7$ $-303=-10n+7$ $10n=310$ $n=31$ **n must be a natural number for CA mark to be awarded.** There are 31 negative terms in the sequence of 33 terms $\text{P(neg only)}=\frac{31}{33}$ or 0,94 or 93,94%	✓CA equating to -303 ✓CA value of n ✓CA answer (3) **OR** ✓CA equating to -303 ✓CA value of n ✓CA answer (3)
		[11]

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QUESTION 4

4.1.	220 ; 400 ; 540 ; 640 180 ; 140 ; 100.....first difference −40 ; −40.....second difference $2a=-40$ $3a+b=180$ $a+b+c=220$ $a=-20$ $3(-20)+b=180$ $-20+240+c=220$ $b=240$ $c=0$ $T_n=-20n^2+240n$	✓A $2a=-40$ ✓A $3(-20)+b=180$ ✓A $-20+240+c=220$ (3)
4.2	180 ; 140 ; 100;... ; −180 $T_n=-40n+220$ $-180=-40n+220$ $40n=400$ $n=10$ Between the 10^{th} and 11^{th} terms ***n* must be a natural number for CA mark to be awarded.** **OR** $-20n^2+240n-[-20(n-1)^2+240(n-1)]=-180$ $-20n^2+240n+20n^2-40n+20-240n+240=-180$ $-40n=-440$ $n=11$ Between the 10^{th} and 11^{th} terms ***n* must be a natural number for CA mark to be awarded.** **OR** 220 ; 400 ; 540 ; 640 ; 700 ; 720 ;700 ; 640 ;540 ; 400 ; 220 ; ... 180 ; 140 ; 100 ; 60 ; 20 ; −20 ; −60 ; −100 ; −140 ; −180 ; ... Between the 10^{th} and 11^{th} terms	✓A $T_n=-40n+220$ (1^{st} diffs.) ✓CA equating to −180 ✓CA value of n ✓CA answer (4) **OR** ✓A T_n-T_{n-1} ✓CA equating to −180 ✓CA value of n ✓CA answer (4) **OR** ✓✓A expansion of 1^{st} diff. to T_{10} ✓✓CA answer (4)
4.3	$-20n^2+240n=-62\,000$ $20n^2-240n-62\,000=0$ $n^2-12n-3100=0$ $(n-62)(n+50)=0$ $n=62$ $\because n\neq-50$ $T_{61}=-59\,780$ $T_{61}+-2\,220=-62\,000$ $\therefore$ −2 220 must be added ***n* must be a natural number for CA mark to be awarded.**	✓A $-20n^2+240n=-62\,000$ ✓CA standard form (quadratic) ✓CA value of n ✓CA answer (4)
		[11]

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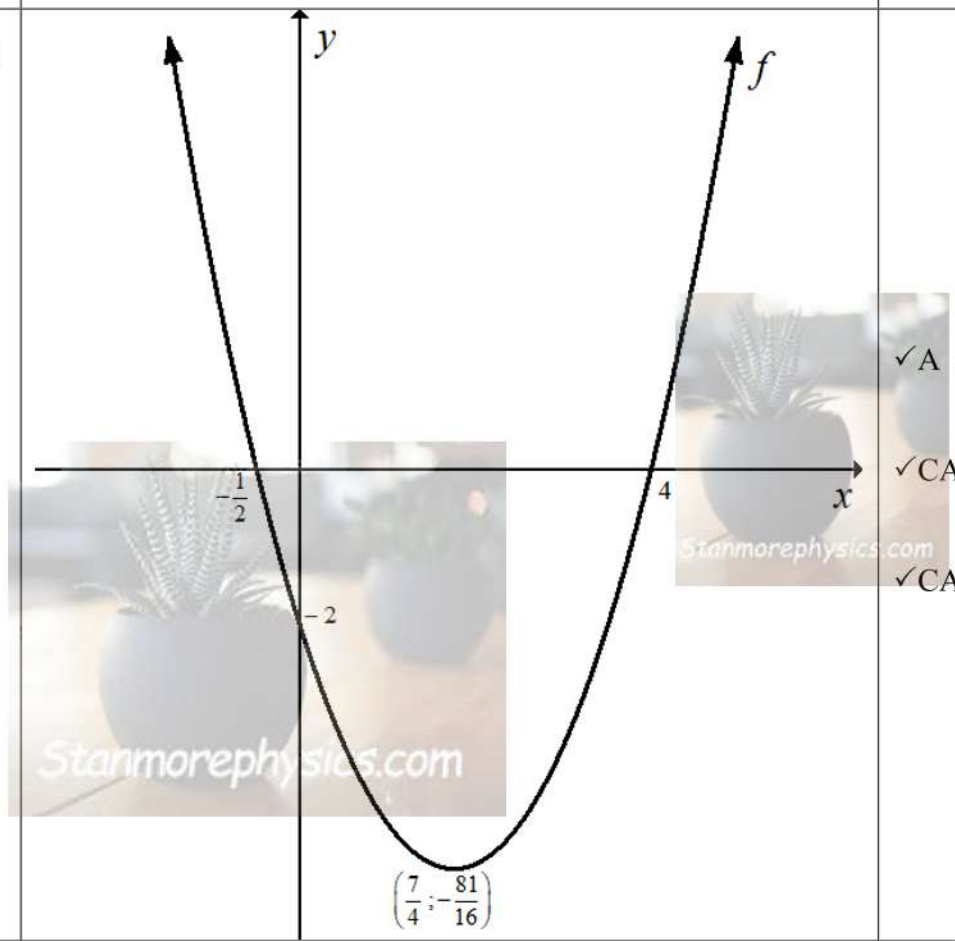
QUESTION 5

5.1.1	$y=-2$ OR $(0\,;-2)$	✓A answer (1)
5.1.2	$f(x)=ax^2+bx-2$ $9=a(-2)^2+b(-2)-2$ $11=4a-2b$ $b=2a-\frac{11}{2}$ and $13=a(6)^2+b(6)-2$ $15=36a+6b$ $15=36a+6\left(2a-\frac{11}{2}\right)$ $15=36a+12a-33$ $48=48a$ $a=1$ $11=4(1)-2b$ OR $15=36(1)+6b$ $b=-\frac{7}{2}$ **OR** $f(x)=ax^2+bx-2$ $9=a(-2)^2+b(-2)-2$ $11=4a-2b$ $a=\frac{11}{4}+\frac{1}{2}b$ and $13=a(6)^2+b(6)-2$ $15=36a+6b$ $a=\frac{5}{12}-\frac{1}{6}b$ $\therefore \frac{11}{4}+\frac{1}{2}b=\frac{5}{12}-\frac{1}{6}b$ $\frac{2}{3}b=-\frac{7}{3}$ $b=-\frac{7}{2}$ $a=\frac{5}{12}-\frac{1}{6}\left(-\frac{7}{2}\right)$ $a=1$	✓A substitution of $(-2\,;9)$ ✓A substitution of $(6\,;13)$ ✓A substitution of b in terms of a ✓A simplification (4) **OR** ✓A substitution of $(-2\,;9)$ ✓A substitution of $(6\,;13)$ ✓A equating in terms of b ✓A simplification (4)

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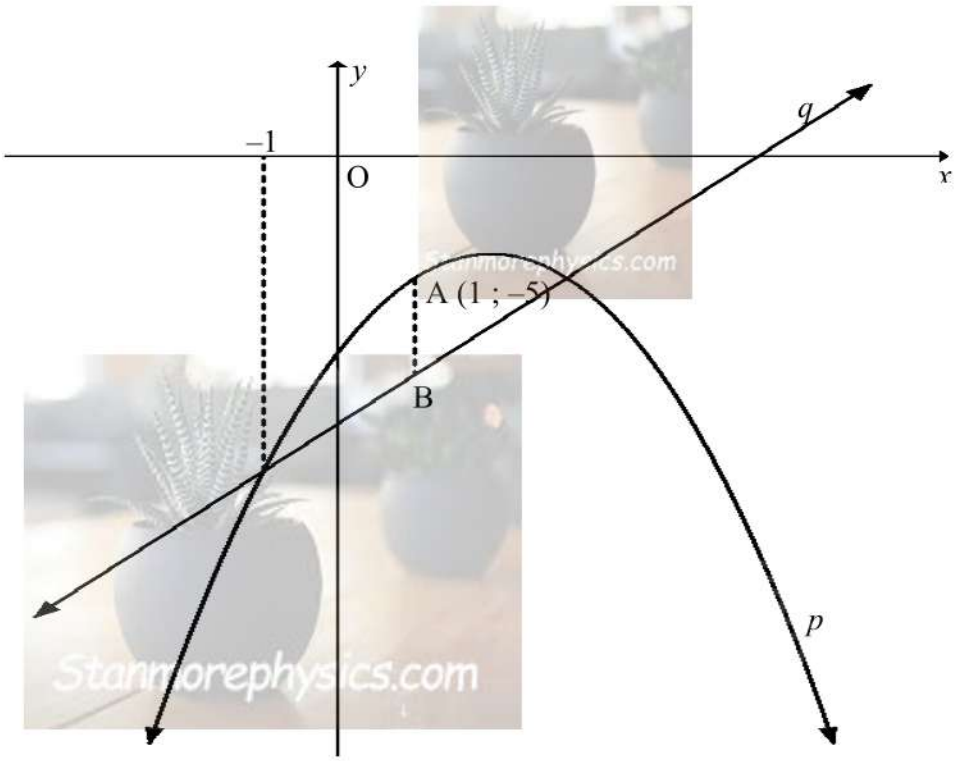
	OR $f(x)=ax^2+bx-2$ $9=a(-2)^2+b(-2)-2$ $11=4a-2b$ $b=2a-\frac{11}{2}$ and $13=a(6)^2+b(6)-2$ $15=36a+6b$ $b=\frac{5}{2}-6a$ $\therefore 2a-\frac{11}{2}=\frac{5}{2}-6a$ $8a=8$ $a=1$ $b=2(1)-\frac{11}{2}$ $b=-\frac{7}{2}$	**OR** ✓A substitution of $(-2\ ;\ 9)$ ✓A substitution of $(6\ ;\ 13)$ ✓A equating in terms of a ✓A simplification (4)
5.1.3	$f(x)=x^2-\frac{7}{2}x-2$ $x^2-\frac{7}{2}x-2=0$ $2x^2-7x-4=0$ $(2x+1)(x-4)=0$ **OR** $x=\frac{-(-7)\pm\sqrt{(-7)^2-4(2)(-4)}}{2(2)}$ $x=-\frac{1}{2}$ or $x=4$	✓A let $y=0$ ✓A factors or quadratic formula ✓CA both answers (3)
5.1.4	$x=-\frac{b}{2a}$ **OR** $x=\frac{x_1+x_2}{2}$ $x=-\frac{\left(-\frac{7}{2}\right)}{2(1)}$ **OR** $x=\frac{-\frac{1}{2}+4}{2}$ $x=\frac{7}{4}$ or $1\frac{3}{4}$ or $1{,}75$ $f\left(\frac{7}{4}\right)=\left(\frac{7}{4}\right)^2-\frac{7}{2}\left(\frac{7}{4}\right)-2$ $y=-\frac{81}{16}$ or $-5\frac{1}{16}$ or $-5{,}06$ $\therefore$ Turning point is $\left(\frac{7}{4}\ ;-\frac{81}{16}\right)$ **Answer only, FULL marks**	✓A correct substitution ✓CA value of x ✓CA value of y (3)

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	OR $f(x) = x^2 - \frac{7}{2}x - 2$ $= x^2 - \frac{7}{2}x + \frac{49}{16} - \frac{49}{16} - 2$ $= \left(x - \frac{7}{4}\right)^2 - \frac{8}{16}$ $\therefore$ turning point is $\left(\frac{7}{14}; \frac{-81}{16}\right)$ **Answer only, FULL marks**	**OR** ✓A completing the square ✓CA value of x ✓CA value of y (3)
5.1.5		✓A shape (concave up) ✓CA intercepts with the axes ✓CA Turning point (3)
5.1.6	$h(x) = x^2 - \frac{15}{2}x + 10$ $= x^2 - \frac{15}{2}x + \left(\frac{15}{4}\right)^2 - \left(\frac{15}{4}\right)^2 + 10$ $= \left(x - \frac{15}{4}\right)^2 - \frac{65}{16}$ $\therefore$ Turning point is $\left(\frac{15}{4}; -\frac{65}{16}\right)$ $\therefore$ translate f 2 units to the right and 1 unit up downloaded from Stanmorephysics.com	✓A Turning point of h : $\left(\frac{15}{4}; -\frac{65}{16}\right)$ ✓CA 2 units right & ✓CA 1 unit up (3)

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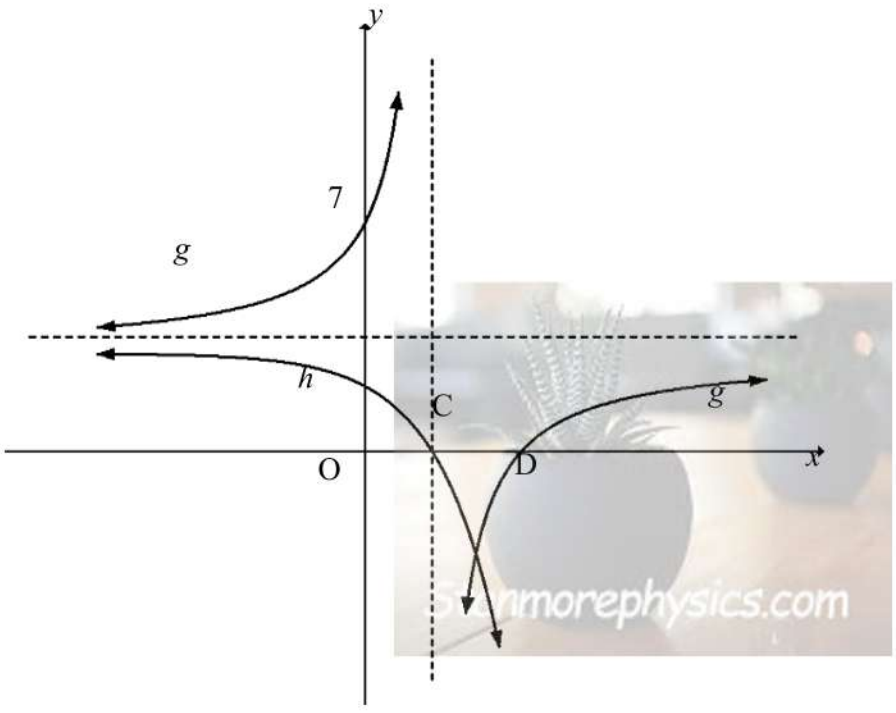
	OR Axis of symmetry of h: $-\frac{\left(-\frac{15}{2}\right)}{2(1)}$ $x=\frac{15}{4}$ or $3\frac{3}{4}$ or $3,75$ translate f by 2 units to the right $y=\left(\frac{15}{4}\right)^2-\frac{15}{2}\left(\frac{15}{4}\right)+10$ $y=-\frac{65}{16}$ or $-4\frac{1}{16}$ or $-4,06$ Turning point is $\left(\frac{15}{4};\frac{-65}{16}\right)$ $\therefore$ and also translate f by 1 unit up	**OR** ✓A 2 units right ✓A Turning point of h : $\left(\frac{15}{4};-\frac{65}{16}\right)$ ✓CA 1 unit up (3)



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5.2	$p(x)=-(x-2)^2-4$ $p(-1)=-(-1-2)^2-4$ $y=-13$ or $(-1\,;-13)$ $B(1\,;-9)$ $m=\frac{y_2-y_1}{x_2-x_1}$ $m=\frac{-9+13}{1+1}$ or $\frac{-13+9}{-1-1}$ $m=2$ $y=mx+c$ $-13=2(-1)+c$ or $-9=2(1)+c$ $c=-11$ $y=2x-11$ $-(x-2)^2-4 < 2x-11$ $-x^2+4x-4-4-2x+11<0$ $x^2-2x-3>0$ $(x+1)(x-3)>0$ for $p(x)<q(x)$: $\therefore x<-1$ or $x>3$ **OR** $x\in(-\infty\,;-1)\cup(3\,;\infty)$ **If a learner wrote ONLY $x<-1$, award 1 out of 7 marks**	✓A $y=-13$ ✓A $B(1\,;-9)$ ✓CA value of m ✓CA equation of q ✓CA standard form ✓CA✓CA answer
		[24]

QUESTION 6



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6.1	$y \in R;\ y < 3$ **OR** $y \in (-\infty\ ;\ 3)$	✓A answer (1)
6.2	$h(x) = -3^x + 3$ $0 = -3^x + 3$ $3^x = 3$ $x = 1$ $C(1\ ;\ 0)$ **Answer only, FULL marks**	✓A let $y = 0$ ✓A coordinate of A (2)
6.3	$p = -1$ $q = 3$ $g(x) = \frac{a}{x+p} + q$ $7 = \frac{a}{0-1} + 3$ $4 = \frac{a}{-1}$ $a = -4$ $g(x) = \frac{-4}{x-1} + 3$ **If using CA, the value of a MUST be negative**	✓A subst. of p and q values ✓A substitution of $(0\ ;\ 7)$ ✓CA value of a ✓CA equation of g (4)
6.4	$g(x) = \frac{-4}{x-1} + 3$ $0 = \frac{-4}{x-1} + 3$ $-3 = \frac{-4}{x-1}$ $-3x + 3 = -4$ $x = \frac{7}{3}$ $\therefore D\left(\frac{7}{3};0\right)$ $CD = \frac{7}{3} - 1$ **OR** $CD = \sqrt{\left(1 - \frac{7}{3}\right)^2 + (0-0)^2}$ $CD = \frac{4}{3}$ or $1\frac{1}{3}$ or 1,33 units	✓A let $y = 0$ **OR** $g(x) = 0$ ✓A value of x ✓CA answer (3)
6.5	$y - y_1 = m(x - x_1)$ $y - 3 = -1(x - 1)$ $y = -x + 4$ **Answer only, FULL marks** **OR** $y = mx + c$ $3 = -1(1) + c$ $c = 4$ $y = -x + 4$ **Answer only, FULL marks even if left at $c = 4$.**	✓CA subst. of gradient & $(1\ ;\ 3)$ ✓CA answer (2) **OR** ✓CA subst. of gradient & $(1\ ;\ 3)$ ✓CA answer (2)

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6.6	from the graph, to have positive roots only: $\therefore t < 2$ but from f to h ,to have positive roots only: $t < 2+2$ $\therefore t < 4$ **Answer only, FULL marks** **OR** $-3^x + 5 = t$ $\left(-3^x + 3\right) + 2 = t$ $h(x) + 2 = t$ $y_{\text{int}} = 2$ $\therefore t - 2 < 2$ $t < 4$ **Answer only, FULL marks**	✓A $t < 4$ ✓A✓A answer (3) ✓A translate h 2 units up **OR** y-intercept is 2 ✓A✓A answer (3)
6.7	$m(x) = g(x) - 3$ $m(x) = \frac{-4}{x-1} + 3 - 3$ $m(x) = \frac{-4}{x-1}$ $\frac{-4}{x-1} = 5kx - k$ $(x-1)(5kx-k) = -4$ $5kx^2 - kx - 5kx + k + 4 = 0$ $5kx^2 - 6kx + k + 4 = 0$ $b^2 - 4ac = 0$ $(-6k)^2 - 4(5k)(k+4) = 0$ $36k^2 - 20k(k+4) = 0$ $36k^2 - 20k^2 - 80k = 0$ $16k^2 - 80k = 0$ $k^2 - 5k = 0$ $k(k-5) = 0$ $k \neq 0 \quad or \quad k = 5$	✓CA equation of m ✓CA equating both equations ✓CA standard form ✓CA subst. to $\Delta = 0$ ✓CA factors ✓✓CA answer with selection (7)
		[22]

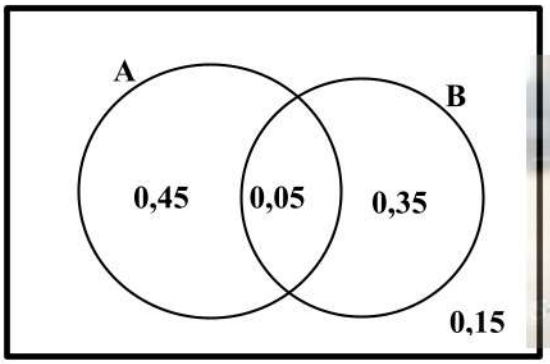
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QUESTION 7

7.1	$1+i_{eff}=\left(1+\frac{i_{nom}}{m}\right)^{m}$ $i_{eff}=\left(1+\frac{0,18}{12}\right)^{12}-1$ $r=0,195618.....\times 100\%$ $r=19,56\%$	**B/D : incorrect formula**	✓A correct formula ✓A correct substitution ✓CA answer (3)
7.2	$A=P(1-i)^{n}$ $A=R725000(1-0,105)^{5}$ $A=R416\,344,84$	**B/D : incorrect formula**	✓A $n=5$ [independent mark] ✓A correct substitution of P and i ✓CA answer (3)
7.3	$A=P(1+i)^{n}$ $3P=P\left(1+\frac{r}{12}\right)^{4\times 12}$ $\sqrt[48]{3}=1+\frac{r}{12}$ $r=27,78\%$	**B/D : incorrect formula**	✓A correct substitution ✓A $\frac{r}{12}$ & $n\times 12$ ✓CA simplification using $\sqrt[48]{\ }$ ✓CA answer (4)
7.4	$A_4=75\,000\left(1+\frac{0,15}{4}\right)^{4\times 4}$ A_4 (after withdrawal) $=135\,167,0854-5\,000$ $A_6=130\,167,0854\left(1+\frac{0,12}{2}\right)^{2\times 2}$ $A_6=R164\,332,95$ No, the amount will not be sufficient **OR** $A=\left(75\,000\left(1+\frac{0,15}{4}\right)^{4\times 4}-5\,000\right)\left(1+\frac{0,12}{2}\right)^{2\times 2}$ $A=R164\,332,95$ No, the amount will not be sufficient.		✓A $75\,000\left(1+\frac{0,15}{4}\right)^{4\times 4}$ ✓A $-5\,000$ ✓A $\times\left(1+\frac{0,12}{2}\right)^{2\times 2}$ ✓CA total amount ✓CA conclusion (5) **OR** ✓A $75\,000\left(1+\frac{0,15}{4}\right)^{4\times 4}$ ✓A $-5\,000$ ✓A $\times\left(1+\frac{0,12}{2}\right)^{2\times 2}$ ✓CA total amount ✓CA conclusion (5)
			[15]

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QUESTION 8

8.1.1	$P(A \text{ or } B) = 1 - P(\text{not}(A \text{ or } B))$ $= 1 - \frac{3}{20}$ $= \frac{17}{20}$ or 0,85 or 85%	✓A substitution into correct rule ✓A answer (2)
8.1.2	$P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$ $0,85 = 0,5 + 0,4 - P(A \text{ and } B)$ $P(A \text{ and } B) = 0,05$ or $\frac{1}{20}$ Not mutually exclusive, $P(A \text{ and } B) \neq 0$	✓A substitution to a correct rule ✓CA answer ✓CA NOT mutually exclusive (3)
8.1.3		✓CA 0,45 or $\frac{9}{20}$ ✓CA 0,35 or $\frac{7}{20}$ ✓CA 0,15 or $\frac{3}{20}$ (3)
8.1.4	$P(\text{not A or (A and not B)})$ $= P(\text{not A}) + P(\text{A and not B}) - P(\text{not A and (A and not B)})$ $= 0,5 + 0,45 - 0$ $= 0,95$ **OR** $P(\text{A and not B}) = 0,45$ $P(\text{not A or (A and not B)}) = (0,35 + 0,15) + 0,45$ $P(\text{not A or (A and not B)}) = 0,95$	✓CA correct substitution ✓CA answer (2) **OR** ✓A 0,45 ✓CA answer (2)

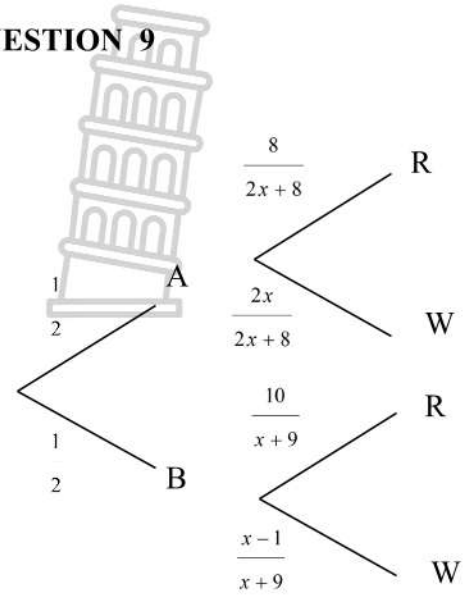
	Cheese sandwich	Chicken Mayo sandwich	Total
Grade 10	**182**	18	200
Grade 11	**46**	4	**50**
Total	**228**	**22**	**250**

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8.2.1	Total grade 10 & 11 learners $= 200 \times \frac{5}{4}$ $= 250$ **Answer only, FULL marks** **OR** let the number of grade 11 learners be x $\frac{x}{200+x} = \frac{1}{5}$ $200 + x = 5x$ $4x = 200$ $x = 50$ Total grade 10 & 11 learners $= 200 + 50$ $= 250$ **Answer only, FULL marks**	✓A $200 \times \frac{5}{4}$ ✓A answer (2) ✓A 50 grade 11 learners ✓A answer (2)
8.2.2	$P(\text{grade 10 and Chicken Mayo}) = \frac{18}{250}$ $= \frac{9}{125}$ or $0,07$ $P(\text{grade 10}) \times P(\text{Chicken Mayo}) = \frac{200}{250} \times \frac{22}{250}$ $= \frac{44}{625}$ or $0,07$ $P(\text{grade 10 and Chicken Mayo}) = P(\text{grade 10}) \times P(\text{Chicken Mayo})$ $\therefore$ The events are independent	✓CA $\frac{9}{125}$ or $0,07$ ✓CA $\frac{200}{250} \times \frac{22}{250}$ ✓CA $\frac{44}{625}$ or $0,07$ ✓CA conclusion (4)
		[16]

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QUESTION 9



If a learner was able to show $\frac{1}{2}\left(\frac{2x}{2x+8}\right)$ or $\left(\frac{2x}{4x+16}\right)$ **and** $\frac{1}{2}\left(\frac{x-1}{x+9}\right)$ or $\left(\frac{x-1}{2x+18}\right)$ **on a tree diagram only, award 2 out of 7 marks.**

	$\frac{1}{2}\left(\frac{2x}{2x+8}\right)\times\frac{1}{2}\left(\frac{x-1}{x+9}\right)=\frac{1}{20}$	✓A $\frac{1}{2}\left(\frac{2x}{2x+8}\right)$ or $\left(\frac{2x}{4x+16}\right)$
	$\left(\frac{2x}{2x+8}\right)\left(\frac{x-1}{x+9}\right)=\frac{1}{5}$	✓A $\frac{1}{2}\left(\frac{x-1}{x+9}\right)$ or $\left(\frac{x-1}{2x+18}\right)$
	$\frac{2x(x-1)}{(2x+8)(x+9)}=\frac{1}{5}$	✓M multiply. both probabilities on LHS
	$10x^2-10x=2x^2+26x+72$	✓A equating to $\frac{1}{20}$ or 0,05 i.e. 5%
	$8x^2-36x-72=0$	
	$2x^2-9x-18=0$	✓CA standard form
	$(2x+3)(x-6)=0$	
	$x\neq-\frac{3}{2}$ or $x=6$	✓CA both answers with selection
	$P(R)_B=\frac{10}{15}$	
	$=\frac{2}{3}$ or 0,67 or 66,67%	✓CA $\frac{10}{15}$ or $\frac{2}{3}$ or 0,67 or 66,67%
		[7]
		TOTAL MARK : 150

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KWAZULU-NATAL PROVINCE
EDUCATION
REPUBLIC OF SOUTH AFRICA

NATIONAL SENIOR CERTIFICATE

GRADE 11

TO: PROVINVIAL COORDINATOR, SUBJECT ADVISORS , DEPARTMENTAL HEADS & TEACHERS WHO HAD LEARNERS WRITING KZN MATHS PAPER 1 , GRADE 11 ON 06th OF NOVEMBER 2026.

AMENDMENT OF THE TYPING ERROR & Q9 SOLUTION.

Please note the following amendment based to the
TYPING ERROR & ADJUSTMENT TO Q9 FINAL STUDENT.

PAGE	NUMBER	ON THE MEMO	AMENDMENT
10	Question 5 (5.1.4)	$f(x) = x^2 - \frac{7}{2}x - 2$ $= x^2 - \frac{7}{2}x + \frac{49}{16} - \frac{49}{16} - 2$ $= \left(x - \frac{7}{4}\right)^2 - \frac{8}{16}$ $\therefore$ turning point is $\left(\frac{7}{14}; \frac{-81}{16}\right)$	$f(x) = x^2 - \frac{7}{2}x - 2$ $= x^2 - \frac{7}{2}x + \frac{49}{16} - \frac{49}{16} - 2$ $= \left(x - \frac{7}{4}\right)^2 - \frac{81}{16}$ $\therefore$ turning point is $\left(\frac{7}{4}; \frac{-81}{16}\right)$
17	Question 9 (answer)	$x \neq -\frac{3}{2}$ or $x = 6$ $P(R)_B = \frac{10}{15}$ $= \frac{2}{3}$ or 0,67 or 66,67%	$x \neq -\frac{3}{2}$ or $x = 6$ $P(R)_B = \frac{1}{2} \times \frac{10}{15}$ $= \frac{1}{3}$ or 0,33 or 33,33%

Please ensure that this amendment(s) reaches the schools that offers mathematics in the year 2026.