basic education
Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE 2025
MATHEMATICS PAPER 1
GRADE 9

SECTION A

- *One mark per answer.*
- *There are no half marks.*
- *Tick* (✓) only the correct answer and underline the incorrect one.

No.		Expected answer	Key (✓)	Rationale/Clarification
1.	C	Rational number	✓	A recurring decimal fraction is a rational number.
2.	C	180	✓	$18 = 2 \times 3^2$ $60 = 2^2 \times 3 \times 5$ LCM $= 2^2 \times 3^2 \times 5$ LCM $= 180$
3.	A	15	✓	$75 = 3 \times 5^2$ $105 = 3 \times 5 \times 7$ $1\,125 = 3^2 \times 5^3$ $\therefore$ HCF $= 3 \times 5$ $= 15$
4.	D	55 000	✓	$5:2 = 7$ parts Kaizer Chiefs fans $= \frac{5}{7} \times 77\,000$ $= 55\,000$

No.		Expected answer	Key (✓)	Rationale/Clarification
5.	A	132 km	✓	Car 1: Distance $= x$ Speed $= 140$ km/h Time $= \frac{x}{140}$ h Car 2: Distance $= 286 - x$ Speed $= 120$ km/h Time $= \frac{286-x}{120}$ h $\frac{x}{140} = \frac{286-x}{120}$ $140(286 - x) = 120 \times x$ $40\,040 - 140x = 120x$ $-140x - 120x = -40\,040$ $-260x = -40\,040$ $\frac{-260x}{-260} = \frac{-40\,040}{-260}$ $x = 154$ Distance $= 286 - x$ $= 286 - 154$ $= 132$ ∴ Car 2 travelled 132 km OR Distance 1$= 140 \times$ tyd Distance 2$= 120 \times$ tyd Total distance $= 260 \times$ time $= 286$ Time $= 1{,}1$ hours Distance 2$= 120 \times 1{,}1$ $= 132$ km
6.	A	R1 627,50	✓	$A = P(1 + i)^n$ $= \text{R}7\,750\left(1 + \frac{10}{100}\right)^2$ $= \text{R}9\,377{,}50$ CI $= \text{R}9\,377{,}50 - \text{R}7\,750$ $= \text{R}1\,627{,}50$ Compound Interest is R1 627,50
7.	C	$-4 \times (7 \times 11)$	✓	$(-4 \times 7) \times 11$ $= -4 \times (7 \times 11)$ Associate property is grouping of numbers in any order for multiplication.

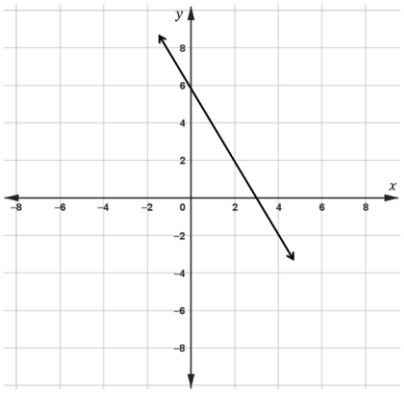
No.		Expected answer	Key (✓)	Rationale/Clarification
8.	B	8	✓	$3-4-7$ Additive inverses: $=-3+4+7$ $=8$ **OR** $3-4-7$ $=-8$ Additive inverse: $=8$
9.	D	94	✓	$12-(6-10)+18-(-30)\times 2$ $=12-(-4)+18+60$ $=16+18+60$ $=94$
10.	C	20	✓	$\frac{4(-6)-(10)-8(12\div 16)}{-12+10}$ $=\frac{-24-10-6}{-2}$ $=\frac{-40}{-2}$ $=20$
11.	A	-5	✓	$-2^3+1^2+\sqrt{49\times 4}\div 7$ $=-8+1+14\div 7$ $=-7+2$ $=-5$
12.	B	$\frac{1}{5}$	✓	$\frac{\sqrt[3]{-64}+5}{\sqrt{4^2+3^2}}$ $=\frac{-4+5}{\sqrt{16+9}}$ $=\frac{1}{\sqrt{25}}$ $=\frac{1}{5}$
13.	A	$2n$	✓	$6n^3\div 3n^2$ $=6\div 3\times n^3\div n^2$ $=2\times n^{3-2}$ $=2n$
14.	A	$\frac{1}{a^8b^4}$	✓	$\frac{(ab)^0\times (a^3b)^{-2}}{(ab)^2}$ $=\frac{1\times a^{-6}b^{-2}}{a^2b^2}$ $=\frac{1}{a^8b^4}$

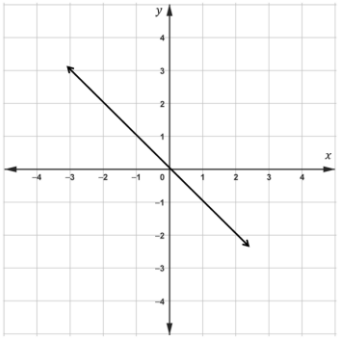
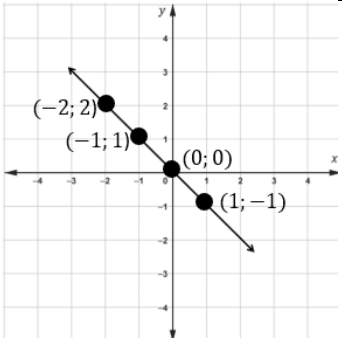
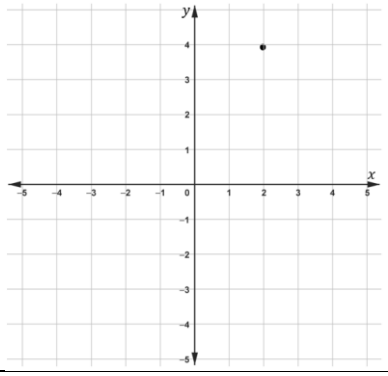
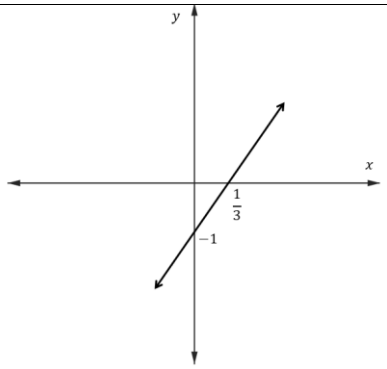
No.		Expected answer	Key (✓)	Rationale/Clarification
15.	D	$\frac{7}{y}$	✓	$\frac{3(m^{10}y)^0 \times y^5}{y^6} + \sqrt{25y^2} \times y^{-2} - \frac{(m^{-1}y)^3}{m^{-3}y^4}$ $= 3(1) \times y^{-6+5} + 5 \times y^{1-2} - \frac{m^{-3}y^3}{m^{-3}y^4}$ $= 3y^{-1} + 5y^{-1} - y^{3-4}$ $= \frac{3}{y} + \frac{5}{y} - \frac{1}{y}$ $= \frac{7}{y}$
16.	D	$\frac{81}{29}$	✓	$T_5 = \frac{27 \times 3}{20 + 9} = \frac{81}{29}$
17.	D	10	✓	$T_n = -4n + 11$ $-29 = -4a + 11$ $4a = 29 + 11$ $4a = 40$ $a = 10$
18.	B	32	✓	Stars in design 4 = Horizontal + Vertical $= (8 \times 2) + (12 + 4)$ $= 16 + 16$ $= 32$
19.	A	25	✓	Number pattern: 1; 4; 7; … $T_n = 3n - 2$ $73 = 3n - 2$ $75 = 3n$ $n = 25$
20.	D C	The constant difference increases by 1 each time. Every alternate term has an even numerator.	✓	$\frac{1}{2} + \frac{3}{2} = 2$; $2 + \frac{5}{2} = \frac{9}{2}$; $\frac{9}{2} + \frac{7}{2} = 8$ $\frac{1}{2}; \frac{2}{1}; \frac{9}{2}; \frac{8}{1}; \ldots$
21.	C	Each term is the square of its position.	✓	$1 = (1)^2$; $4 = (2)^2$; $9 = (3)^2$; $16 = (4)^2$
22.	C	$T_n = n^2 + 1$	✓	$T_1 = (1)^2 + 1 = 2$ $T_2 = (2)^2 + 1 = 5$ $T_3 = (3)^2 + 1 = 10$ $T_4 = (4)^2 + 1 = 17$ $\therefore T_n = n^2 + 1$
23.	C	3	✓	$\frac{cab^2}{3} = \frac{1}{3}ab^2c$ $\frac{1}{3}ab^2c; -4ab^2c; ab^2c$
24.	C	-1	✓	$-\sqrt{x^8} = -x^4$ Coefficient is -1.

No.		Expected answer	Key (✓)	Rationale/Clarification
25.	A	$2 \times x^2 + 5y$	✓	Two terms: $2x^2 + 5y$
26.	C	$-2a^2 + 3a$	✓	$-a(a-3) - a^2$ $= -a^2 + 3a - a^2$ $= -2a^2 + 3a$
27.	B	$\frac{1}{2}x$	✓	$\frac{x^3 + x^3}{\sqrt{16x^4}}$ $= \frac{2x^3}{4x^2}$ $= \frac{x}{2}$
28.	D	$-125a^6$	✓	$\left(\sqrt[3]{-27a^6} - 2a^2\right)^3$ $= (-3a^2 - 2a^2)^3$ $= (-5a^2)^3$ $= -125a^6$
29.	C	$9n^2 - 30n + 25$	✓	$(3n-5)^2$ $= 9n^2 - 30n + 25$
30.	D	-8	✓	$(2y + x)^3$ $= (-2)^3$ $= -8$
31.	A	$(2m+3)(2m-3)$	✓	$4m^2 - 9$ $= (2m+3)(2m-3)$
32.	A	$\left(x - \frac{1}{2}\right)\left(x - \frac{1}{4}\right)$	✓	$x^2 - \frac{3}{4}x + \frac{1}{8}$ $= \left(x - \frac{1}{2}\right)\left(x - \frac{1}{4}\right)$
33.	A	$4(x-6)(x+1)$	✓	$4x^2 - 20x - 24$ $= 4(x^2 - 5x - 6)$ $= 4(x-6)(x+1)$
34.	D	$(x-3)(x+2)(x-2)$	✓	$x^2(x-3) + 4(3-x)$ $= x^2(x-3) - 4(x-3)$ $= (x-3)(x^2-4)$ $= (x-3)(x+2)(x-2)$
35.	A	$\frac{1}{a+1}$	✓	$\left(1 - \frac{1}{a}\right) \div \left(a - \frac{1}{a}\right)$ $= \frac{a-1}{a} \div \frac{a^2-1}{a}$ $= \frac{a-1}{a} \times \frac{a}{(a+1)(a-1)}$ $= \frac{1}{a+1}$
36.	B	18	✓	$\frac{2}{3}x = 12$ $2x = 12 \times 3$

No.		Expected answer	Key (✓)	Rationale/Clarification
				$2x = 36$ $x = 18$
37.	A	Sipho is twice as old as Mary. In 4 years' time he will be 12 years' older than Mary.	✓	$2x + 4 = x + 16$ 2(Mary's age) + 4 = Mary's age +16 = Sipho's age
38.	A	$x = 2$	✓	$3x - 2 = 4$ $3x = 6$ $x = 2$
39.	A	$x = -4$	✓	$2^{x-1} = \frac{1}{32}$ $2^{x-1} = 2^{-5}$ $x - 1 = -5$ $x = -5 + 1$ $x = -4$
40.	D	50	✓	$\frac{x}{5} = \frac{1}{9}(y - 32)$ $\frac{1}{9}(y - 32) = \frac{10}{5}$ $y - 32 = 2 \times 9$ $y = 18 + 32$ $y = 50$
41.	B	$6\frac{1}{4}$	✓	$y = x^2$ $= \left(\frac{5}{2}\right)^2$ $= \frac{25}{4}$ $= 6\frac{1}{4}$
42.	C	3 m	✓	$(x + 3)(x + 1) = 15$ $x^2 + 4x + 3 = 15$ $x^2 + 4x - 12 = 0$ $(x + 6)(x - 2) = 0$ $x = -6$ or $x = 2$ Height= $x + 1$ $= -6 + 1$ $= -5$ m (n/a) **OR** $x + 1$ $= 2 + 1$ $= 3$ m
43.	C	$a = -6$ or $a = 6$	✓	$a^2 = 36$ $(a - 6)(a + 6) = 0$ $a = 6$ or $a = -6$
44.	B	$x = 2$ or $x = -1$	✓	$(2x - 4)(x + 1) = 0$

No.		Expected answer	Key (✓)	Rationale/Clarification
				$2x - 4 = 0$ or $x + 1 = 0$ $x = 2$ or $x = -1$
45.	C	$x = 1$ or $x = 6$	✓	$7x - 6 = x^2$ $0 = x^2 - 7x + 6$ $(x - 6)(x - 1) = 0$ $x = 1$ or $x = 6$
46.	D	$a = 1$ or $a = -1$	✓	$(a + 2)^2 - 4(a + 2) + 3 = 0$ $[(a + 2) - 3][(a + 2) - 1] = 0$ $(a - 1)(a + 1) = 0$ $a = 1$ or $a = -1$
47.	C	-3	✓	$y = -2x + 3$ $= -2(3) + 3$ $= -6 + 3$ $= -3$
48.	B	$y = 3x + 5$	✓	$y = 3x + 5$ $= 3(0) + 5$ $= 5$ $y = 3x + 5$ $= 3(1) + 5$ $= 8$ $y = 3x + 5$ $= 3(2) + 5$ $= 11$
49.	B	-4	✓	$y = 3x - 1$ $-13 = 3k - 1$ $-13 + 1 = 3k$ $\frac{-12}{3} = \frac{3k}{3}$ $-4 = k$
50.	A	Add 2 to 3 times the input value to get the output value.	✓	$y = 3x + 2$ 3(input value) $+2$ =output value
51.	D	Output value is 5 times the input value minus 1.	✓	$y = 5x - 1$ $= 5(-3) - 1$ $= -15 - 1$ $= -16$ $y = 5(\frac{1}{5}) - 1$ $= 1 - 1$ $= 0$ $y = 5(0) - 1$ $= 0 - 1$ $= -1$ $y = 5(2) - 1$

No.		Expected answer	Key (✓)	Rationale/Clarification
				$= 10 - 1$ $= 9$ $y = 5(4) - 1$ $= 20 - 1$ $= 19$
52.	D		✓	$y = -2(x - 3)$ $= -2(-1 - 3)$ $= -2(-4)$ $= -8$ $(-1; 8)$ $6 = -2(x - 3)$ $6 = -2x + 6$ $6 - 6 = -2x$ $0 = -2x$ $0 = x$ $(0; 6)$ $y = -2(1 - 3)$ $= -2(-2)$ $= 4$ $(1; 4)$
53.	A	2	✓	The graph cuts the y-axis at 2.
54.	C	$(1; 0)$	✓	$y - 2x = -2$ $y = 2x - 2$ For x-intercepts: $y = 0$ $0 = 2x - 2$ $2x = 2$ $\frac{2x}{2} = \frac{2}{2}$ $x = 1$ $(1; 0)$
55.	D	2	✓	$(0; 0)$ and $(2; 4)$ $m = \frac{\text{vertical change}}{\text{horizontal change}}$ $= \frac{4 - 0}{2 - 0}$ $= \frac{4}{2}$ $= 2$

No.		Expected answer	Key (✓)	Rationale/Clarification
56.	B		✓	
57.	A/ B/ C/ D		✓	$(2;4)$ $(1;-3)$ $(3;5)$ $(-1;-5)$
58.	B	$x=-2$	✓	The graph is parallel to the y-axis and cuts the x-axis at -2
59.	D		✓	$y=3x-1$ For x-intercept: $y=0$ $0=3x-1$ $-3x=-1$ $\frac{-3x}{-3}=\frac{-1}{-3}$ $x=\frac{1}{3}$ $\left(\frac{1}{3};0\right)$ For y-intercept: $x=0$ $y=3(0)-1$ $y=0-1$ $y=-1$ $(0;-1)$
60.	B	$y=2x+4$	✓	$y+2x+4=0$ $y=-2x-4$ For x-intercept: $y=0$ $0=-2x-4$ $2x=-4$ $\frac{2x}{2}=\frac{-4}{2}$ $x=-2$ T $(-2;0)$

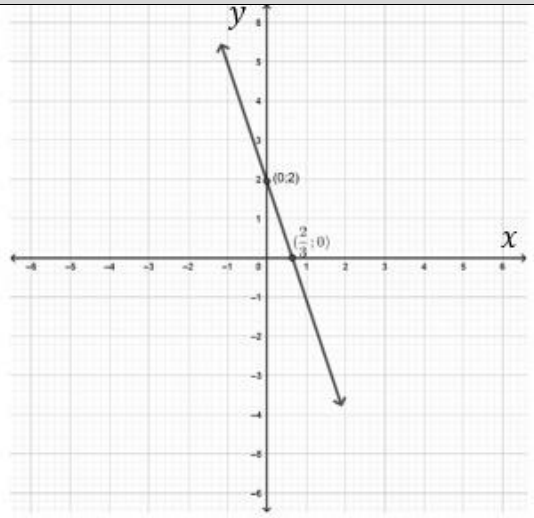
No.		Expected answer	Key (✓)	Rationale/Clarification
				Coordinates of the y-intercept of f are $(0;4)$. $m = \frac{4-0}{0-(-2)}$ $= 2$ Equation of f is $y = mx + c$ $y = 2x + c$ $c = 4$ $y = 2x + 4$
SECTION A TOTAL [60]				

SECTION B

- Do not penalise the learner for the same mistake twice.
- *There are no half marks.*
- Underline errors committed by learners do not place a cross (X).

No.	Expected answer	Rationale/Clarification	Mark
61.	$\left(\frac{x^{-3}y}{-2x^{-2}}\right)^{-3}$ $=\frac{x^{(-3)(-3)}y^{-3}}{-2^{-3}x^{(-2)(-3)}}$ $=\frac{x^{9}y^{-3}}{-2^{-3}x^{6}}$ ✓**M** $=-8x^{9-6}\times\frac{1}{y^{3}}$ ✓**CA** $=\frac{-8x^{3}}{y^{3}}$ ✓**CA** **OR** $\left(\frac{x^{-3}y}{-2x^{-2}}\right)^{-3}$ $=\left(\frac{-2x^{-2}}{x^{-3}y}\right)^{3}$ $=\frac{-2^{-3}x^{(-2)(-3)}}{x^{(-3)(-3)}y^{-3}}$ ✓**M** $=\frac{-8x^{-6}}{x^{-9}y^{3}}$ ✓**CA** $=\frac{-8x^{3}}{y^{3}}$ ✓**CA**	Exponent laws: 1 mark Simplification: 1 mark Answer: 1 mark	(3)
62.	$\frac{2m^{2}-2m}{m}\times\frac{1}{m^{2}-2m+1}$ $=\frac{2m(m-1)}{m}\times\frac{1}{(m-1)^{2}}$ ✓✓**M** $=\frac{2}{m-1}$ ✓**CA**	$2m(m-1)$: 1 mark $(m-1)^{2}$: 1 mark Answer: 1 mark	(3)

No.	Expected answer	Rationale/Clarification	Mark
63.	$(2x+1)(2x+3) = 3x^2 - 12$ ✓✓**M** $4x^2 + 8x + 3 = 3x^2 - 12$ $x^2 + 8x + 15 = 0$ $(x+3)(x+5) = 0$✓**CA** $x = -3$ or $x = -5$ Small number: $2x + 1 = 2(-3) + 1 = -5$ Or $2x + 1 = 2(-5) + 1 = -9$ ∴ smallest, odd number is -9✓**CA** **Note: During discussion of marking guideline the following solution was suggested. It was decided that the statement is incorrect but we will allow CA marking to the benefit of the learner. Keep in mind that 3 is NOT the smallest uneven number.** $x(x+2) = 3x^2 - 12$✓M $x^2 + 2x = 3x^2 - 12$ $-2x^2 + 2x + 12 = 0$ $2x^2 - 2x - 12 = 0$ $2(x^2 - x - 6) = 0$ $2(x-3)(x+2) = 0$ ✓CA $x = 3$ or $x = -2$ n/a $x = 3$✓CA	$(2x+1)(2x+3)$: 1 mark $3x^2 - 12$: 1 mark Factors: 1 mark Answer: 1 mark $3x^2 - 12$: 1 mark Factors: 1 mark Answer: 1 mark	(4)
64.	64.1 $y = -3x + 2$ For y-intercept: $x = 0$ $y = -3(0) + 2$ $= 0 + 2$ $= 2$✓**A** For x-intercept: $y = 0$ $0 = -3x + 2$ $3x = 2$ $\frac{3x}{3} = \frac{2}{3}$ $x = \frac{2}{3}$✓**A**	2: 1 mark $\frac{2}{3}$: 1 mark **OR** $(0; 2)$: 1 mark $\left(\frac{2}{3}; 0\right)$: 1 mark	(2)

No.	Expected answer		Rationale/Clarification	Mark
	64.2		Plotting $(0;2)$: 1 mark Plotting $(\frac{2}{3};0)$: 1 mark Shape: 1 mark **CA from 64.1**	(3)
				SECTION B TOTAL [15]
				TOTAL: [75]

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GEC PILOT STUDY
MARKING GUIDELINES 2024
MATHEMATICS PAPER 1
GRADE 9

SECTION A

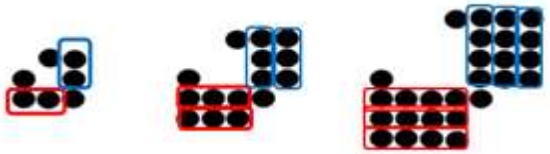
- *One mark per answer.*
- *No half marks may be allocated.*
- *Tick* (✓) only the correct answer and underline the incorrect answer.

No.		Expected answer	Key (✓)	Rational/Clarification
1.	D	$\frac{8}{0}$	✓	A number divided by zero is undefined.
2.	B	5	✓	$125 = 5 \times 5 \times 5$ $200 = 2 \times 2 \times 2 \times 5 \times 5$ $510 = 2 \times 3 \times 5 \times 17$ HCF $= 5$
3.	A	1 800	✓	$75 = 3 \times 5 \times 5$ $450 = 2 \times 3 \times 3 \times 5 \times 5$ $1800 = 2 \times 2 \times 2 \times 3 \times 3 \times 5 \times 5$ LCM $= 2 \times 2 \times 2 \times 3 \times 3 \times 5 \times 5$
4.	C	Indirect proportion.	✓	As time decreases, the speed increases with the product of time and speed remaining constant.

No.		Expected answer	Key (✓)	Rational/Clarification
5.	C	$\frac{2}{3}$ hour	✓	Speed $= \frac{d}{t}$ $= \frac{6}{24}$ $= 0{,}25$ km/h Time $= \frac{d}{s}$ $= \frac{10}{0{,}25}$ $= 40$ min $= \frac{2}{3}$ h **OR** Speed $= \frac{d}{t}$ $= \frac{6}{24 \div 60}$ $= 15$ km/h Time $= \frac{d}{s}$ $= \frac{10}{15}$ $= \frac{2}{3}$ h
6.	A	$4{,}5\ \%$	✓	$2023 - 2006 = 17$ years $A = P(1+i)^n$ $R11\,291{,}45 = R5300\left(1 + \frac{i}{100}\right)^{17}$ $\left(\sqrt[17]{\frac{11291{,}45}{5300}} - 1\right) \times 100 = i$ $4{,}5\ \% = i$
7.	C	$(-a \times e)(b \times -g)$	✓	Changing the order of factors does not change the product.
8.	B	$-\frac{1}{5}$ and 5	✓	The sum of additive inverses is zero. The product of multiplicative inverses is 1.
9.	A	22	✓	$6 - (3-5) + 9 - (-15) \div 3$ $= 6 - (-2) + 9 - (-5)$ $= 22$
10.	A	-21	✓	$\frac{5(3)(4) - 5(3 - (4) \times 3)}{-3 - 2}$ $= \frac{60 - 5(-9)}{-5}$ $= \frac{60 + 45}{-5}$ $= -21$

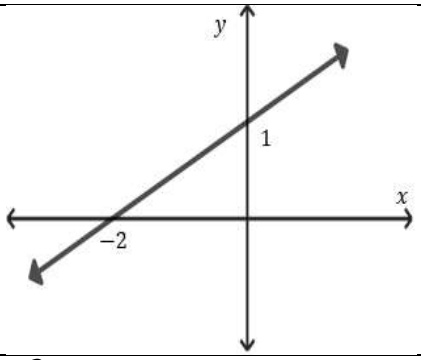
No.		Expected answer	Key (✓)	Rational/Clarification
11.	D	-1	✓	$\frac{\sqrt[3]{125}-3^2+0+1}{-4+\sqrt{121}-\sqrt[3]{64}}$ $=\frac{5-9+0+1}{-4+11-4}$ $=\frac{-3}{3}$ $=-1$
12.	A	16	✓	$\left(\frac{\sqrt[3]{27}+\sqrt{\frac{50}{2}}}{\frac{4^2-\sqrt[3]{8}}{\sqrt{49}}}\right)^2$ $=\left(\frac{3+5}{\frac{16-2}{7}}\right)^2$ $=\left(8\times\frac{7}{14}\right)^2$ $=16$
13.	A	$6n^5$	✓	$3n^3\times 2n^2$ $=3\times 2\times n^{3+2}$ $=6n^5$
14.	B	$-8x^6y^3$	✓	$(-2x^2y)^3$ $=(-2)^3(x^2)^3y^3$ $=-8x^6y^3$
15.	A	6	✓	$2^{-2}\times 6^3\times 3^{-2}$ $=2^{-2}\times(2\times 3)^3\times 3^{-2}$ $=2^{-2}\times 2^3\times 3^3\times 3^{-2}$ $=2^{-2+3}\times 3^{3-2}$ $=2^1\times 3^1$ $=6$ **OR** $\frac{1}{\cancel{4}}\times\frac{\overset{6}{\cancel{216}}}{1}\times\frac{1}{\cancel{9}}$ $=6$
16.	C	$\frac{-3}{x^2y^{11}}$	✓	$-3(x^{-1}y^2)^{-3}\times(xy)^{-5}$ $=-3x^3y^{-6}\times x^{-5}y^{-5}$ $=-3x^{3-5}y^{-6-5}$ $=-3x^{-2}y^{-11}$ $=\frac{-3}{x^2y^{11}}$

No.		Expected answer	Key (✓)	Rational/Clarification
17.	B	$\frac{y^4}{4}$	✓	$\left(\frac{y^2+\frac{1}{y^{-2}}}{y^2\times y^2}\right)^{-2}$ $\left(\frac{y^2+y^2}{y^2\times y^2}\right)^{-2}$ $=\left(\frac{2y^2}{y^{2+2}}\right)^{-2}$ $=\left(\frac{2^{-2}\times y^{-4}}{y^{-8}}\right)$ $=\frac{4^{-1}\times y^{-4}}{y^{-8}}$ $=4^{-1}\times y^{-4+8}$ $=\frac{y^4}{4}$ **OR** $\left(\frac{y^2+\frac{1}{y^{-2}}}{y^2\times y^2}\right)^{-2}$ $\left(\frac{y^2+y^2}{y^2\times y^2}\right)^{-2}$ $=\left(\frac{2y^2}{y^{2+2}}\right)^{-2}$ $=\left(\frac{y^4}{2y^2}\right)^{2}$ $=\frac{y^8}{4y^4}$ $=\frac{y^4}{4}$
18.	D	$\frac{2y^2}{x}$	✓	$\frac{\sqrt{4x^6y^{-2}}\times(x^2)^{-2}}{(2x)^0y^{-3}}$

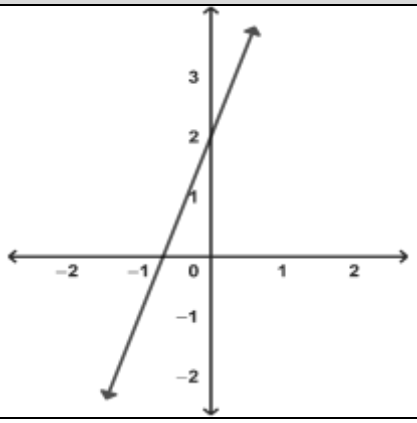
No.		Expected answer	Key (✓)	Rational/Clarification
				$= 2x^{3-4}y^{-1+3}$ $= 2x^{-1}y^2$ $= \frac{2y^2}{x}$
19.	B	Add 1 to the previous term to get the next term.	✓	$\frac{1}{2};\ \frac{3}{2};\ \frac{5}{2};\ \frac{7}{2};\ \ldots$ $+1\ \ +1\ \ +1$
20.	A	8; 13	✓	0; 1; 1; 2; 3; 5; 8; 13 Add the previous two terms to determine the next term. (Fibonacci)
21.	C		✓	 Pattern 1: 2 dots, 1 row, 1 column Pattern 2: 3 dots, 2 rows, 2 columns Pattern 3: 4 dots, 3 rows, 3 columns 3 anchor dots in each pattern
22.	A	$324\ \text{cm}^2$	✓	9th square's side $= 18$ cm Area $= s^2$ $= (18\ \text{cm})^2$ $= 324\ \text{cm}^2$
23.	D	$-3\text{p}q^2\text{r}$ and $5\text{p}q^2r$	✓	Like terms have the same variables with the same exponents.
24.	D	3	✓	The term with the smallest coefficient is $-2x^3$ and the exponent of x is 3.
25.	D	3	✓	Only plus and minus signs separate terms.
26.	A	$-6y^3 + 12y^2 - 1$	✓	$-3y(2y^2 - 4y) - 1$ $= -6y^3 + 12y^2 - 1$
27.	D	$5\text{y}^2 + 3\text{y} - 2$	✓	$\frac{15y^3 - 3y(-y+2) + 6y^2}{3y}$ $= \frac{15y^3 + 3y^2 - 6y + 6y^2}{3y}$ $= \frac{15y^3 + 9y^2 - 6y}{3y}$ $= 5\text{y}^2 + 3\text{y} - 2$
28.	C	$\frac{5y^4}{4}$	✓	$\sqrt{\text{y}^8 + \frac{9}{16}\text{y}^8}$

No.		Expected answer	Key (✓)	Rational/Clarification
				$= \sqrt{\frac{16y^8 + 9y^8}{16}}$ $= \sqrt{\frac{25y^8}{16}}$ $= \frac{5y^4}{4}$
29.	B	$16x^2 - 4x + \frac{1}{4}$	✓	$\left(4x - \frac{1}{2}\right)^2$ $= \left(4x - \frac{1}{2}\right)\left(4x - \frac{1}{2}\right)$ $= 16x^2 - 2x - 2x + \frac{1}{4}$ $= 16x^2 - 4x + \frac{1}{4}$
30.	C	16	✓	$\frac{9p^2 - 8q}{r}$ $= \frac{9(-1)^2 - 8\left(\frac{1}{8}\right)}{\frac{1}{2}}$ $= \frac{9 - 1}{\frac{1}{2}}$ $= 8 \times 2$ $= 16$
31.	A	$(5a - 4b)(5a + 4b)$	✓	$25a^2 - 16b^2$ $= (5a - 4b)(5a + 4b)$
32.	C	$(y - 7)(y - 4)$	✓	$y^2 - 11y + 28$ $= (y - 7)(y - 4)$
33.	B	$9(p - 2)(p + 5)$	✓	$9p^2 + 27p - 90$ $= 9(p^2 + 3p - 10)$ $= 9(p - 2)(p + 5)$
34.	C	$\frac{2(a - 2)}{a + 2}$	✓	$\frac{2a^2 - 10a + 12}{a(a + 2) - 3(a + 2)}$ $= \frac{2(a^2 - 5a + 6)}{(a + 2)(a - 3)}$ $= \frac{2(a - 2)(a - 3)}{(a + 2)(a - 3)}$ $= \frac{2(a - 2)}{a + 2}$
35.	C	$4 - p - q$	✓	$\frac{48r - 3r(p + q)^2}{12r + 3pr + 3qr}$ $= \frac{3r[16 - (p + q)^2]}{12r + 3pr + 3qr}$

No.		Expected answer	Key (✓)	Rational/Clarification
				$= \frac{3r[4-(p+q)][4+(p+q)]}{3r(4+p+q)}$ $= \frac{3r[4-p-q][4+p+q]}{3r(4+p+q)}$ $= 4-p-q$
36.	D	$\frac{1}{2}$	✓	$-2 = -4m$ $\frac{-2}{-4} = m$ $m = \frac{1}{2}$
37.	B	-14	✓	$\frac{a}{7} = -2$ $a = -14$
38.	A	$x = 4$	✓	$(x-4)^2 = 0$ $x-4=0$ $x=4$
39.	C	$x = 3$ or $x = 1$	✓	$(x-3)(1-x) = 0$ $x-3=0$ or $1-x=0$ $x=3$ or $-x=-1$ $x=1$
40.	D	$y = 2x-3$	✓	y is the selling price, x is the cost price. Selling price = double cost price minus three.
41.	A	5	✓	$4(x-1) = 16$ $x-1=4$ $x=5$
42.	C	$(1;1)$	✓	$y = x^2-1$ $1 \neq (1)^2-1$ Does NOT satisfy the equation.
43.	B	$x = 6$ or $x = -3$	✓	$x^2-3x-18=0$ $(x-6)(x+3)=0$ $x=6$ or $x=-3$
44.	B	-1	✓	$2^m + 0{,}5 = 1$ $2^m = 1-\frac{1}{2}$ $2^m = 2^{-1}$ $m=-1$
45.	A	0 or $\frac{1}{4}$	✓	$\frac{6x}{3} - x = 4x^2$ $6x-3x = 12x^2$ $12x^2-3x=0$ $3x(4x-1)=0$ $x=0$ or $x=\frac{1}{4}$

No.		Expected answer	Key (✓)	Rational/Clarification
46.	C	10 and 12 or -10 and -12	✓	Let the first even number be $2x$. $2x(2x+2)=120$ $4x^2+4x-120=0$ $4(x^2+x-30)=0$ $4(x+6)(x-5)=0$ $x=-6$ or $x=5$ Even numbers: 10 and 12 of -12 and -10
47.	B	-4	✓	<table><tr><td>Input</td><td>-1</td><td>2</td><td>5</td><td>8</td></tr><tr><td>Output</td><td>b</td><td>-1</td><td>2</td><td>5</td></tr></table> Output = Input -3 $b=-1-3$ $b=-4$
48.	C	7	✓	$y=-2x-3$ $=-2(-5)-3$ $=10-3$ $=7$
49.	D	Multiply by -3	✓	$-2(-3)=6$ $-1(-3)=3$ $2(-3)=6$ ∴ multiply by -3
50.	C		✓	The table clearly indicates the x-intercept, $(-2;\ 0)$ and the y-intercept, $(0;1)$.
51.	D	$\frac{-3}{22}$	✓	$-\frac{2a}{3}+1=-8a$ $-2a+3=-24a$ $-2a+24a=-3$ $22a=-3$ $a=\frac{-3}{22}$
52.	B	$y=-2x+4$	✓	$A(3;-2)\rightarrow A'(2;0)$ Join the points. y-intercept $=4$ Gradient $=\frac{\text{vertical change}}{\text{horizontal change}}$ $=\frac{-2-0}{3-2}$ $=-2$

No.		Expected answer	Key (✓)	Rational/Clarification
				The equation is $y = -2x + 4$.
53.	C	$(0; 3)$	✓	$y = -2x + 3$ If $x = 0$ then $y = 3$.
54.	B	$y = 3$	✓	Gradient of a horizontal line equal to zero. y-intercept of f is 3, therefore $y = 3$.
55.	D	$\frac{-3}{2}$	✓	The gradient of a line is equal to the coefficient of x in $y = mx + c$.
56.	A	$y = -x - 2$	✓	$m = \frac{y_1 - y_2}{x_1 - x_2}$ $= \frac{-3 - (-2)}{1 - 0}$ $= \frac{-1}{1}$ $= -1$ y-intercept: $(0; -2)$ c $= -2$ Substitute in $y = mx + c$ $y = -x - 2$
57.	D	$(2; 0)$ and $(0; 4)$	✓	x –intercept: $y = 0$ $4x + 2(0) = 8$ $x = 2$ $(2; 0)$ y-intercept: $x = 0$ $4(0) + 2y = 8$ $y = 4$ $(0; 4)$
58.	C	$c < 0; m > 0$	✓	The y-intercept is negative and the gradient is positive.
59.	D	$-\frac{2}{3}$	✓	Use any two of $(-2;3)$; $(4; -1)$ or $(1; 1)$. m $= \frac{y_2 - y_1}{x_2 - x_1}$ $= \frac{-1 - 3}{4 + 2}$ $= -\frac{4}{6}$ $= -\frac{2}{3}$

No.		Expected answer	Key (✓)	Rational/Clarification
60.	C		✓	$2y - 6x - 4 = 0$ $y = 3x + 2$ Standard form ∴ gradient $= 3$ and y-intercept $= 2$
				SECTION A TOTAL **[60]**

SECTION B

Marking guideline for Section B		
• Do not penalise the learner for the same mistake more than once. • *There are no half marks.* • Underline errors committed by learners do not place a cross (X). • In instances where learners have used different but mathematically sound strategies to solve problems, they (learners) must be credited. • Consistent accuracy must be applied.		
M	key	a mark for a correct method
A		a mark for accurate calculation
CA		a mark for consistent accuracy

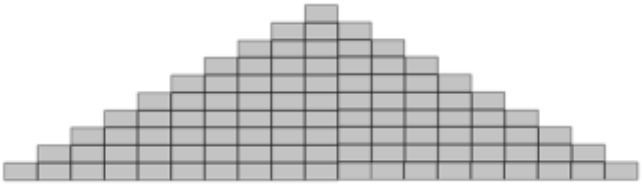
No.	Expected answer	Rational/Clarification	Mark
61.	$\frac{-5x(2x-4x^2)+x^2(1+16x)}{-3x}$ $=\frac{-10x^2+20x^3+x^2+16x^3}{-3x}$ ✓**M** $=\frac{-9x^2+36x^3}{-3x}$ ✓**CA** $=3x-12x^2$ ✓**CA** **OR** $\frac{-5x(2x-4x^2)+x^2(1+16x)}{-3x}$ $=\frac{-5x(2x-4x^2)}{-3x}+\frac{x^2(1+16x)}{-3x}$ $=\frac{-10x^2+20x^3}{-3x}+\frac{x^2+16x^3}{-3x}$ ✓**M** $=\frac{10}{3}x-\frac{20}{3}x^2-\frac{1}{3}x-\frac{16}{3}x^2$ ✓**CA** $=3x-12x^2$ ✓**CA**	Simplification: 1 mark $-9x^2+36x^3$: 1 mark Answer: 1 mark **OR** Simplification: 1 mark $\frac{10}{3}x-\frac{20}{3}x^2-\frac{1}{3}x-\frac{16}{3}x^2$: 1 mark Answer: 1 mark	(3)
62.	$2x^2-6x=(x-3)(x+3)$ $2x^2-6x=x^2-9$ ✓**M** $x^2-6x+9=0$ ✓**CA** $(x-3)^2=0$ $x=3$ ✓**CA**	x^2-9: 1 mark Standard form**:** 1 mark Answer: 1 mark	(3)

No.	Expected answer	Rational/Clarification	Mark
63.	Used $(-1;2)$ and $(5;-1)$. Any 2 applicable points may be used. ✓**M** Gradient $= \frac{2-(-1)}{-1-5}$ $= \frac{2+1}{-1-5}$ $= \frac{3}{-6}$ $= -\frac{1}{2}$ ✓**CA** $y = -\frac{1}{2}x + c$ y-intercept: Substitute any applicable point. $0 = -\frac{1}{2}(3) + c$ ✓**M** $c = 0 + \frac{3}{2}$ $= \frac{3}{2}$ *or* $1\frac{1}{2}$ ✓ **CA** $y = -\frac{1}{2}x + 1\frac{1}{2}$ ✓ **CA**	Identification of 2 points: 1 Mark Gradient calculation: 1 Mark **OR** **2 marks for the correct gradient** Substitution of gradient and point: 1 Mark Calculation of y-intercept: : 1 Mark Equation: 1 Mark	(5)

64.

Number of layers in stack	Blocks per layer	Total number of blocks.
1	1	1
2	$1+2=3$	4
3	$3+2=5$	9
4	$5+2=7$	16
5	$7+2=9$	25
6	$9+2=11$	36
7	$11+2=13$	49
8	$13+2=15$	64
9	$15+2=17$	81
10	$17+2=19$	100

OR



OR

Number of layers in stack	Total number of blocks used.
1	1
2	$1+3=4$
3	$1+3+5=9$
4	$1+3+5+7=16$
5	$1+3+5+7+9=25$
6	$1+3+5+7+9+11=36$
7	$1+3+5+7+9+11+13=49$
8	$1+3+5+7+9+11+13+15=64$
9	$1+3+5+7+9+11+13+15+17=81$
10	$1+3+5+7+9+11+13+15+17+19=100$

Number of blocks is equal to number of layers multiplied by itself. ✓**M**
Number of blocks $= y$. Number of layers $= x$
$y = x \times x$ ✓**M**
$y = 10 \times 10$ ✓**M**
$y = 100$✓**CA**

Correct number of blocks for 3 stacks: 1 mark

Correct number of blocks for next 3 stacks: 1 mark

Correct number of blocks for next 3 stacks: 1 mark

Answer: 1 mark

Maths sentence: 1 mark
Formula: 1 mark
Substitution: 1 mark
Answer: 1 mark
Full marks for correct answer only.

(4)

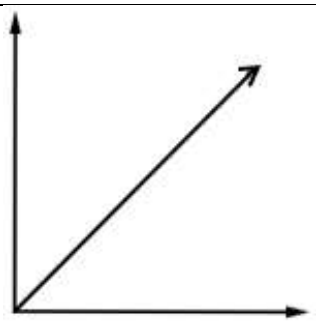
No.	Expected answer	Rational/Clarification	Mark
		SECTION B TOTAL	**[15]**
		TOTAL	**[75]**

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Basic Education
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GEC PILOT STUDY
MARKING GUIDELINE 2023
MATHEMATICS PAPER1
GRADE 9

SECTION A

- *One mark per answer.*
- *There are no half marks.*

No.		Expected answer		Clarification
1.	B	Irrational	✓	
2.	B	108	✓	$12 = 2 \times 2 \times 3$ $18 = 2 \times 3 \times 3$ $27 = 3 \times 3 \times 3$ $2 \times 2 \times 3 \times 3 \times 3 = 108$
3.	A	$\frac{2}{3}$	✓	Numerators $8 = 2^3$ $12 = 2^2 \times 3$ HCF$= 2 \times 2 = 4$ Denominators $30 = 2 \times 3 \times 5$ $36 = 2^2 \times 3^2$ HCF $= 2 \times 3 = 6$ HCF $= \frac{4}{6} = \frac{2}{3}$
4.	C		✓	

No.		Expected answer		Clarification
5.	A	103,13 km/h	✓	$s = \frac{d}{t}$ $120 = \frac{d}{2{,}75}$ $d = 120 \times 2{,}75$ $d = 330$ km $s = \frac{330}{3{,}2}$ $s = 103{,}13$ km/h
6.	D	R1 339,42	✓	$A = P(1+i)^n$ $A = R5\,265\left(1 + \frac{12}{100}\right)^2$ $A = R5\,265(1+0{,}12)^2$ $A = R5\,265(1{,}12)^2$ $A = R5\,265(1{,}2544)$ $A = R6\,604{,}42$ $CI = R6\,604{,}42 - R5\,265$ $CI = R1\,339{,}42$
7.	C	$-7 \times (11 \times 4)$	✓	
8.	B	8	✓	$3(4) - 2(2) = 12 - 4$ $= 8$
9.	D	2 and $-\frac{1}{2}$	✓	
10.	C	14	✓	$\frac{2(-3) - (5) - 4(6 \div 8)}{5 - 6}$ $= \frac{-6 - 5 - 4\left(\frac{3}{4}\right)}{-1}$ $= \frac{-14}{-1}$ $= 14$
11.	A	1	✓	$\sqrt{49} - 2^3 + \sqrt[3]{216} \div 3$ $= 7 - 8 + 6 \div 3$ $= 7 - 8 + 2$ $= 1$
12.	C	$\frac{1}{5}$	✓	$\sqrt{\frac{\sqrt[3]{-64} + 5}{4^2 + 3^2}} = \sqrt{\frac{-4 + 5}{16 + 9}}$ $= \sqrt{\frac{1}{25}}$ $= \frac{1}{5}$
13.	A	a^5c	✓	$a^3 \times a^2c$ $= a^5c$

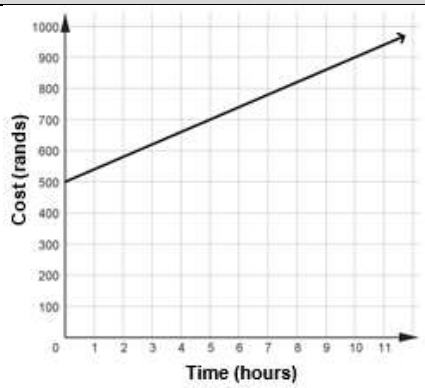
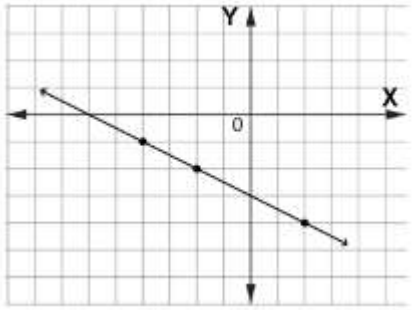
No.		Expected answer		Clarification
14.	C	2^{x+2}	✓	$\frac{4^{x+1}}{2^x}$ $= \frac{(2^2)^{x+1}}{2^x}$ $= \frac{2^{2x+2}}{2^x}$ $= 2^{2x+2-x}$ $= 2^{x+2}$
15.	B	$\frac{b+a}{ab}$	✓	$a^{-1} + b^{-1}$ $= \frac{1}{a} + \frac{1}{b}$ $= \frac{b+a}{ab}$
16.	B	1	✓	$(2^2)^3 \times (2^3)^{-2}$ $= 2^6 \times 2^{-6}$ $= 2^0$ $= 1$
17.	A	$-\frac{8x^3}{y^3}$	✓	$\left(\frac{x^{-3}y}{-2x^{-2}}\right)^{-3}$ $= \left(\frac{-2x^{-2}}{x^{-3}y}\right)^3$ $= \left(\frac{-2x^3}{x^2y}\right)^3$ $= \left(-\frac{2x}{y}\right)^3$ $= -\frac{8x^3}{y^3}$
18.	D	$\frac{7}{y}$	✓	$\frac{3(x+y)^0}{y} + 5y^{-1} - \frac{(x^{-1}y)^3}{x^{-3}y^4}$ $= \frac{3 \times 1}{y} + 5 \times \frac{1}{y} - \frac{x^{-3}y^3}{x^{-3}y^4}$ $= \frac{3}{y} + \frac{5}{y} - \frac{1}{y}$ $= \frac{7}{y}$
19.	B	35	✓	$3 + 5\ ;\ 8 + 7\ ;\ 15 + 9\ ;\ 24 + 11\ = 35$ **OR** Perfect squares -1 $2^2 - 1 = 3$ $3^2 - 1 = 8$ $4^2 - 1 = 15$
20.	C	83	✓	$3 + 6 + 10 + 15 + 21 + 28 = 83$

No.		Expected answer		Clarification
21.	A	A constant ratio of three was used.	✓	
22.	C	$T_n = -2n + 7$	✓	1; 3; 5; 7; … are not consecutive term positions $5;\ a;\ 1;\ b;\ -3;\ c;$ … $a - 5 = 1 - a$ $2a = 6$ $\frac{2a}{2} = \frac{6}{2}$ $a = 3$ 5; 3; 1; … are consecutive terms $3 - 5 = 1 - 3$ $d = -2$ $T_1 = -2(1) + __ = 5$ $T_2 = -2(2) + __ = 3$ $T_3 = -2(3) + __ = 1$ $T_n = -2n + 7$
23.	A	$3x^3$ and $3x(x^2)$	✓	
24.	D	-8 and 6^{th}	✓	$(-2x^2)^3$ $= (-2)^3(x^2)^3$ $= -8x^6$ Coefficient is -8 and degree is 6^{th}
25.	C	$x + 3x^2 + 2 - 4x$	✓	
26.	A	$-4x^3 - 2x^2 + x$	✓	$-x(4x^2 + 2x - 1)$ $= -4x^3 - 2x^2 + x$
27.	A	$3x^2 - 10x + 1$	✓	$3x(x-4) + \frac{4x+2}{2}$ $= 3x(x-4) + \frac{4x}{2} + \frac{2}{2}$ $= 3x^2 - 12x + 2x + 1$ $= 3x^2 - 10x + 1$ **OR** $= \frac{2 \times 3x(x-4) + 4x + 2}{2}$ $= \frac{6x^2 - 24x + 4x + 2}{2}$ $= \frac{6x^2}{2} - \frac{20x}{2} + \frac{2}{2}$ $= 3x^2 - 10x + 1$

No.		Expected answer		Clarification
28.	A	$\frac{x}{2}$	✓	$\sqrt[3]{0{,}125x^3}$ $=\sqrt[3]{\frac{1}{8}x^3}$ $=\sqrt[3]{\frac{1}{2^3}x^3}$ $=\left(\frac{1}{2^3}x^3\right)^{\frac{1}{3}}$ $=\left(\frac{1}{2^3}\right)^{\frac{1}{3}}(x^3)^{\frac{1}{3}}$ $=\frac{1}{2}x$ $=\frac{x}{2}$
29.	C	$2x^2+\frac{17x}{3}-1$	✓	$(x+3)(2x-\frac{1}{3})$ $=2x^2-\frac{x}{3}+6x-\frac{3}{3}$ $=2x^2-\frac{x+18x}{3}-1$ $=2x^2+\frac{17x}{3}-1$
30.	D	16	✓	$-8\left(-\frac{1}{2}\right)^2+10(2)-2$ $=-8\left(\frac{1}{4}\right)+20-2$ $=-2+20-2$ $=16$
31.	A	$(2x-3)(2x+3)$	✓	
32.	B	$(x-8)(x+3)$	✓	
33.	A	$6(y-3)(y+1)$	✓	
34.	B	$x+2$	✓	$\frac{2x^2-2x-12}{2x-6}$ $=\frac{2(x^2-x-6)}{2(x-3)}$ $=\frac{2(x+2)(x-3)}{2(x-3)}$ $=x+2$

No.		Expected answer		Clarification
35.	A	$x+y+1$	✓	$\frac{(x+y)^2-1}{x+y-1}$ $=\frac{(x+y-1)(x+y+1)}{x+y-1}$ $=x+y+1$
36.	A	2	✓	
37.	B	2	✓	$\frac{2p}{2}=\frac{4}{2}$ $p=2$
38.	D	$x=0$ or $x=1$	✓	
39.	D	$b=3$ or $b=-2$	✓	
40.	B	$2x-8=18$	✓	
41.	C	4	✓	$y=16-12$ $y=4$
42.	C	-2	✓	$3^m=9^{-1}$ $3^m=(3^2)^{-1}$ $3^m=3^{-2}$ $m=-2$
43.	D	$p=17$ and $t=6$	✓	$y=x^2+1$ $p=(-4)^2+1$ $p=16+1$ $p=17$ and $y=x^2+1$ $37=t^2+1$ $t^2=36$ $t=\pm 6$ $\therefore t=6$
44.	D	$x=-6$ or $x=1$	✓	$x^2+3x+2x-6=0$ $x^2+5x-6=0$ $(x+6)(x-1)=0$ $x=-6$ or $x=1$

No.		Expected answer		Clarification
45.	B	$a = 0$ or $a = 4$	✓	$\left(\frac{1}{2}a - 1\right)\left(\frac{1}{2}a - 1\right) = 1$ $\frac{1}{4}a^2 - a + 1 = 1$ $\frac{1}{4}a^2 - a = 0$ $a^2 - 4a = 0$ $a(a - 4) = 0$ $a = 0$ or $a - 4 = 0$ $a = 0$ or $a = 4$ **OR** $\frac{1}{2}a - 1 = \pm 1$ $\frac{1}{2}a - 1 = 1$ or $\frac{1}{2}a - 1 = -1$ $\frac{1}{2}a = 2$ or $\frac{1}{2}a = 0$ $a = 4$ or $a = 0$
46.	B	2 m	✓	$A = (x - 18)(x)$ $40 = x^2 - 18x$ $0 = x^2 - 18x - 40$ $0 = (x - 20)(x + 2)$ $x = 20$ or $x = -2$ $\therefore x = 20$ breadth $= 20 - 18$ breadth $= 2$ m
47.	A	$b = 33$	✓	$y = 4x - 3$ $b = 4(9) - 3$ $b = 33$
48.	C	$\boldsymbol{x}$ | -2 | 0 | 2 $\boldsymbol{y}$ | -8 | -2 | 4	✓	
49.	B	$m = (n + 1)^2$	✓	$m = (Even + 1)^2$ $m = (Odd)^2$ $m = Odd$
50.	D	$y = -\frac{1}{2}x + 1$	✓	$m = -\frac{1}{2}$ y-intercept at $(0; 1)$ and $c = 1$ $y = -\frac{1}{2}x + 1$
51.	D	$V = 4t + 6$	✓	Common difference $= 4$ $V = 4t + c$ By inspection: $V = 4t + 6$

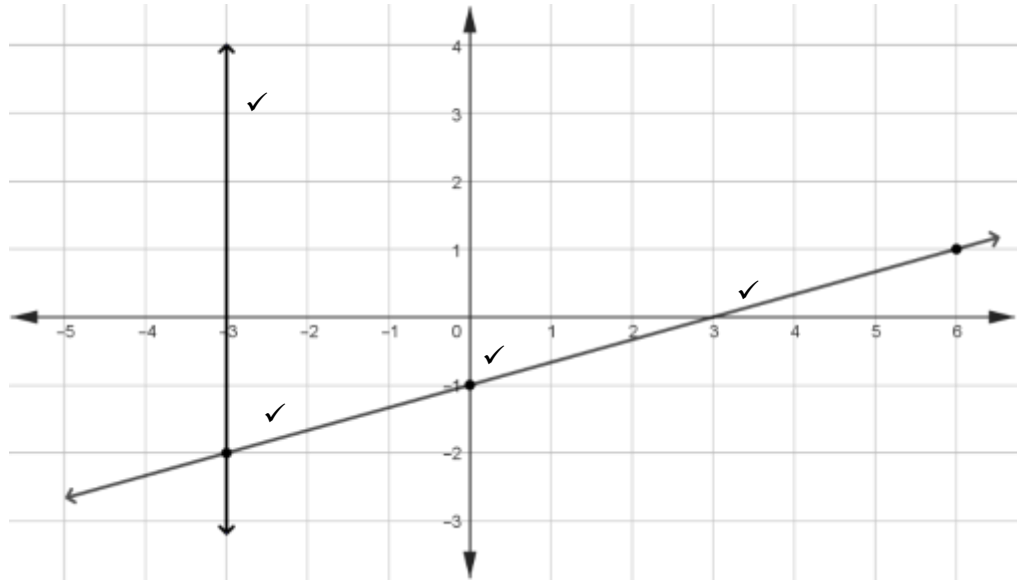
No.		Expected answer		Clarification
52.	A		✓	$c = 40t + 500$ y-intercept = R500 and the gradient = 40
53.	B	$(0; -5)$	✓	
54.	D	1	✓	$y = 2x - 2$ $2x - 2 = 0$ $2x = 2$ $x = 1$
55.	C	$-\frac{3}{4}$	✓	
56.	B		✓	$\boldsymbol{x}$: -4, -2, 2 $\boldsymbol{y}$: -1, -2, -4
57.	C	$\boldsymbol{x}$: 1, 2, 3, 4 $\boldsymbol{y}$: 12, 20, 28, 36	✓	Constant difference of 8
58.	D	$-2x + y - 2 = 0$	✓	$-2x + y - 2 = 0$ $y = 2x + 2$
59.	B	$(-1; -3)$	✓	$y = 2x - 1$ $-3 = 2(-1) - 1$ $-3 = -3$
60.	A	$y = -3x + 5$	✓	$m_{AB} = m_{CD}$ …Parallel lines $y = -3x + c$ $\therefore 2 = -3(1) + c$ $c = 5$
			Section A total	**60**

SECTION B

- Do not penalise the learner for the same mistake twice.
- *There are no half marks.*

MARKING CODES	
M	Method mark
A	Accuracy mark
CA	Consistent Accuracy mark

No.	Expected answer	Clarification	Mark
61.	$y = 3x - 5$ ✓**M** $46 = 3q - 5$ ✓**M** $q = \frac{51}{3}$ $q = 17$ ✓**CA**	General term: 1 mark Substitution: 1 mark Answer: 1 mark Accept $x = 17$ Answer only full marks	3
62.	$\frac{-5y^3(6y-1) - 3y^2(5-10y^2)}{5y^2}$ $= \frac{-30y^4 + 5y^3 - 15y^2 + 30y^4}{5y^2}$ ✓**M** $= \frac{5y^3 - 15y^2}{5y^2}$ $= \frac{5y^2(y-3)}{5y^2}$ ✓**M** $= y - 3$ ✓**CA** **OR** $\frac{y^2(6y-1)}{-y} - \frac{3y^2(5-10y^2)}{5y^2}$ $= \frac{6y^3 - y^2}{-y} - \frac{15y^2 - 30y^4}{5y^2}$ ✓**M** $= \frac{6y^3}{-y} - \frac{y^2}{-y} - \frac{15y^2}{5y^2} + \frac{30y^4}{5y^2}$ $= -6y^2 + y - 3 + 6y^2$ ✓**M** $= y - 3$ ✓**CA**	Simplification:1 mark $\frac{5y^2(y-3)}{5y^2}$:1 mark Answer:1 mark Simplification:1 mark $-6y^2 + y - 3 + 6y^2$:1 mark Answer:1 mark	3

No.	Expected answer	Clarification	Mark
63.	Let x be the mass of the car $900 + 120 + \frac{x}{5} = x$ ✓**M** $4500 + 600 + x = 5x$ ✓**M** $4x = 5100$ $x = 1275$ kg ✓**CA** ∴ The car's engine $= \frac{x}{5}$ $= 255$ kg ✓**CA** **OR** Let x be the mass of the car $900 + 120 + \frac{x}{5} = x$ ✓**M** $900 + 120 = \frac{4}{5}x$ ✓**M** $4x = 5100$ $x = 1275$ kg ✓**CA** ∴ The car's engine $= \frac{x}{5}$ $= 255$ kg ✓**CA**	Equation: 1 mark Simplification: 1 mark $x = 1275$ kg: 1 mark Answer: 1 mark Equation: 1 mark Simplification: 1 mark $x = 1275$ kg: 1 mark Answer: 1 mark	4
64.			
64.1	On graph ✓✓✓**A**	Correct plotting of any 2 points:1 mark Correct y-intercept:1 mark Shape of graph: 1 mark	(3)
64.2	On graph ✓**A**	Correct drawing of graph: 1 mark	(1)

No.	Expected answer	Clarification	Mark
64.3	Distance between x- intercepts $= 6$ units ✓**CA**	Answer: 1 mark	(1)
		Section B total	**15**

Bergvliet High School

GRADE 9

Mathematics Paper 2

NOVEMBER 2025

MARKING GUIDELINES

MARKS : 75

COGNITIVE DISTRIBUTION FOR ASSESSMENT:

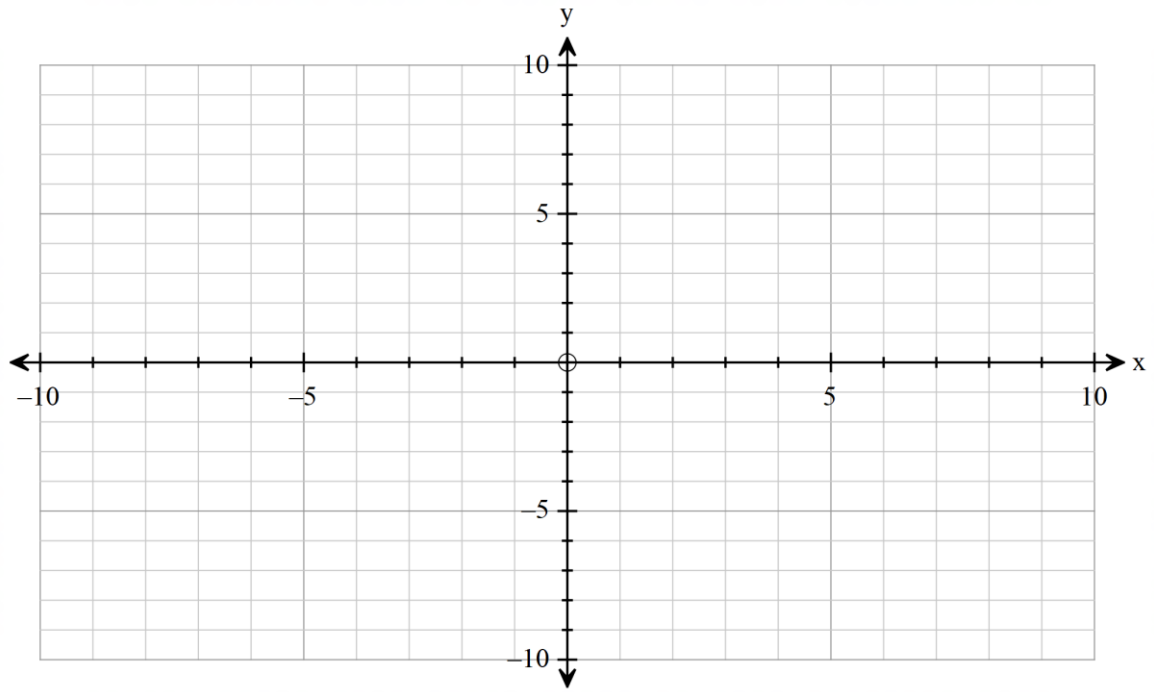
	Level 1	Level 2	Level 3	Level 4
Expected:	25%	45%	20%	10%
Actual:	23%	40%	23%	15%

Symbol	Explanation
M	Method
MA	Method with accuracy
CA	Consistent accuracy
A	Accuracy
C	Conversion
S	Simplification
RT	Reading from a table/graph/document/diagram
SF	Correct substitution in a formula
O	Opinion/Explanation
P	Penalty, e.g. for no units, incorrect rounding off, etc.
R	Rounding off
NPR	No penalty for rounding
NPU	No penalty for units
AO	Answer only
MCA	Method with consistent accuracy

This marking guidelines consists of 6 pages

Q	SOLUTION	EXPLANATION	
1.1.1	<table><tr><td>Number</td><td>Tally</td><td>Frequency</td></tr><tr><td>1</td><td></td><td>4</td></tr><tr><td>2</td><td></td><td>5 ✓</td></tr><tr><td>3</td><td></td><td>7</td></tr><tr><td>4</td><td></td><td>3 ✓</td></tr><tr><td>5</td><td></td><td>3</td></tr><tr><td>6</td><td></td><td>2 ✓</td></tr><tr><td>Total</td><td></td><td>24</td></tr></table>	1 mark allocated for 2 correct rows (3)	L1
1.1.2	1/6 OR 0.17 ✓✓	2AO correct answer (2)	L1
1.1.3	(4+7+3)/24 OR 7/12 OR 14/24 ✓✓	2AO correct answer (2)	L1
1.2.1	12+82+36+55+78+90+27+55+60+86 = 581✓ 581 ÷ 10 ✓ 58.1 ✓	1 mark adding all the amounts 1 mark for dividing by the correct total number 1 mark for the answer (3)	L2
1.2.2	90 – 12 ✓= 78% ✓	1 mark for subtracting the highest from the lowest 1 mark for the correct percentage mark (2)	L2
1.2.3	55 % ✓	1 mark for the correct answer (1)	L1
1.2.4	12, 27, 36, 55, 55, 60, 78, 82, 86, 90 55 + 60 =115✓ 115 ÷ 2 ✓ 57.5 % ✓	1 mark for identifying the middle 2 numbers/median 1 mark for dividing by 2 1 mark for the correct answer (3)	L2
		[16]	

Q	SOLUTION	EXPLANATION	
2.1	A'(2,-3) ✓✓	1 mark for the correct x value 1 mark for the correct y value (2)	L1
2.2	B'(2,-4) ✓✓	1 mark for the correct x value 1 mark for the correct y value (2)	L1
2.3	C'(0,4) ✓ D'(-4,0) E'(4,0)	1 mark for all 3 co-ordinates 1 mark for plotting CDE on the graph 1 mark for plotting the enlarged triangle (3)	L2



2.3.1	Enlarged by a factor of 2 OR multiplied by 2	2 marks for correct explanation (2)	L2
2.4	2-(-2) = 4 units ✓✓	1 mark for subtracting the value 1 mark for the correct length OR 2 AO (2)	L2
2.5	$\frac{1}{2}b.h$ $\frac{1}{2}.(4)$ ✓.(2)✓ 4 units²✓	1 mark for substituting the correct base value 1 mark for substituting the correct height value 1 mark for the correct answer (3)	L2
		[14]	

Q	SOLUTION		EXPLANATION	
3.1	**Statement**	**Reason**	1 x 4 marks for every valid statement 1 x 4 marks for every valid reason provided (8)	L3
	a = 180 - 40˚ = 140˚✓	Co-interior angles = 180˚✓		
	b = 140˚✓	Vertically opposite angles =✓		
	c = 180 – 20 – 140 = 20˚✓	Angles on a str. Line = 180˚✓ OR Vertically opposite angles =		
	d = c = 20º✓	Isosceles triangle OR base angles = ✓		

3.2	<table><tr><th>Statement</th><th>Reason</th></tr><tr><td>$3x + 10$ $+ (2x - 10) + x$ $+ 2x = 360^0$ $8x = 360^0$ $x = \frac{360}{8}$ $x = 45^0$</td><td>Revolution = 360^0</td></tr></table>	1 mark for valid reason 1 mark for simplification 1 mark for dividing by 8 1 mark for the correct answer (4)	L3
3.3	<table><tr><th>Statement</th><th>Reason</th></tr><tr><td>EIG = DEI = 30^0 EDI + DIE = 180-30^0 =150^0✓ EDI = DIE = 150/2 = 75^0✓ GIH = 180 – 75 – 30 = 75✓ IH = GH ∴ GIH = IGH = 75^0✓ ∴ H = 180 - 75 – 75 H = 30^0✓</td><td>Alt. angles = Sum of the angles of a triangle = 180 Isosceles triangle/ base angles of triangle = Angles on a str. Line = 180^0 Isosceles triangle/ base angles of triangle = Sum of the angles of a triangle = 180</td></tr></table>	1 x 5 marks for each statement with the corresponding reason (5)	L4
3.4	<table><tr><th>Statement</th><th>Reason</th></tr><tr><td>HKN = 180 – 120 = 60^0✓ KNM = 180-60 = 120 KNL = 180–120 = 60✓ LKN = 180 – 60 – 60 = 60✓ ∴ KNL is a equilateral triangle</td><td>Co-interior angles = 180 Co-interior angles = 180✓ Str.line = 180✓ Sum of the angles of a triangle = 180✓</td></tr></table>	1 mark for calculating HKN / KNM angle 1 mark for the reason supporting KNM/HKN angle 1 x 2marks for each valid statement 1 x2 marks for each valid reason (6)	L4
		[12]	

Q	SOLUTION	EXPLANATION	
4.1.1	Parallelogram✓	1 mark for the correct answer (1)	L1
4.1.2	AB||DC ✓ AD||BC ✓	1 x 2 marks for each pair of parallel lines stated (2)	L1
4.1.3	Trapezium✓✓	2 marks for the answer (2)	L1
4.1.4	$13^2 - 12^2 = CE^2$ ✓ pythagoras 169 – 144 =CE^2 25 = CE^2 5 = CE✓ Area = base x perpendicular height = $(20 - 5)\ x\ 12$✓ = 15✓ x 12 = 180 cm^2✓	1 mark for substitution into pythag equation 1 mark for CE length 1 mark for correct base value 1 mark for correct height value 1 mark for the final answer in cm^2 (5)	L2
4.2.1	$circumference = 2\pi r$ $157.08 = 2\pi r$✓ $\frac{157.08}{2\pi} = r$✓✓ 25 cm = radius	1 mark for correct substitution in circumference formula 2 marks for manipulation of the formula (3)	L2
4.2.2	Area $\triangle$ AOB $= \frac{1}{2} \times 25^2$ $= 312{,}5\ \text{cm}^2$✓ ∴ area of shaded part = area of circle – area of $\triangle$ AOB $= \frac{1}{4}$✓$\times\ \pi \times 25^2$✓$-312{,}5$✓ $= 178{,}4\ \text{cm}^2$✓	1 mark for the area of the triangle value 1 mark for identifying that we only calculating ¼ of a circle 1 for the correct substitution into the formula of area of circle 1 mark for subtracting the triangle area from the circle area 1 mark for the final answer (5)	L3
4.3	$TSA = s^2 + 2\text{h}.\ b$ $= 12^2 + 2(11\ x\ 12)$✓ $= 144 + 2(132)$ $= 144 + 264$✓✓ $= 408cm^2$✓	1 mark for substituting into the correct formula 1 mark for the simplification (264) 1 mark for adding the 2 values 1 mark for the final answer (4)	L2
		[22] **TOTAL: 75**	

TAXONOMY TABLE

Bloom's Taxonomy Percentage Breakdown

Bloom's Level	Cognitive Skill	Total Marks	% of Paper	Interpretation
Level 1: Remember	Recall facts/definitions	17	**22.67%**	Low-order recall present but not dominant
Level 2: Understand	Interpret/explain concepts	30	**40%**	Some conceptual reasoning
Level 3: Apply	Perform calculations/use formulas	17	**22.67%**	Application-level questions require learners to use information, methods, concepts, theories, or skills in new or concrete situations. Instead of just recalling facts (Level 1) or explaining ideas (Level 2), learners must apply what they know to solve a problem, perform a task, or demonstrate a process.
Level 4: Analyse & Evaluate	Compare, interpret, examine relationships. Justify decisions/choices	11	**14.66%**	Moderate higher-order reasoning

Grade 9 November Paper 2 2024 Memorandum

Question 1

1.1.1

Marks	Frequency ✓	Midpoint ✓	F x m ✓
$0 \le x < 10$	2	5	10
$10 \le x < 20$	5	15	75
$20 \le x < 30$	4	25	100
$30 \le x < 40$	6	35	210
$40 \le x < 50$	3	45	135
TOTAL	20		530

✓ Frequency column
✓ Midpoint column
✓ **CA** Freq. X mid. column

(3)

1.1.2

$\frac{530}{20}$ ✓ $= 26.50$ ✓ **CA for sum of FxM**

✓ fraction
✓ simplified answer
provide full marks if they give only the fraction

(2)

1.1.3

$20 \le x < 30$ ✓✓

✓ ✓

(2)

1.1.4

$30 \le x < 40$ ✓

✓

(1)

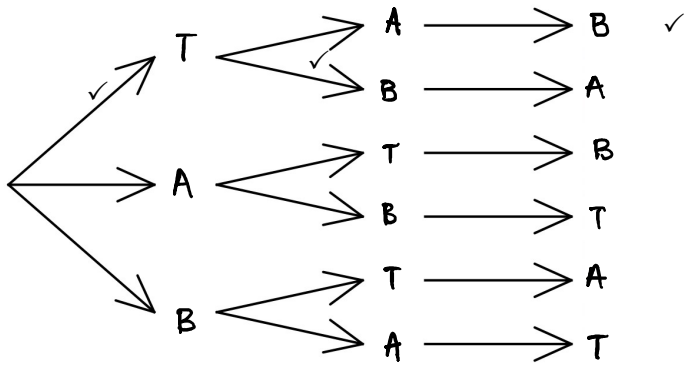
1.2

Positive ✓ linear ✓ relationship

✓ Positive
✓ linear

(2)

1.3



✓ X3 for branches

(3)

1.3.1

S = { TAB ; TBA; ATB; ABT; BAT; BTA}

✓ All correct combinations

(1)

1.3.2

$\frac{2}{6}$

✓ 2/6

(1)

[15]

Question 2

2.1

				Answer
1	Supplementary		A quad…	5
2	The sum of the opposite interior angles		Lines that never intersect…	3 ✓
3	Parallel lines		Triangles are congruent	7✓
4	90°		The exterior …	2✓
5	Kite		Sum to 180°	1✓
6	AAA		diagonals …	4✓
7	AAS			

✓ X5 correct answers (5)

2.2.1

PQ//RT
RT//QR ✓
∴ PQRT //ogram ✓ Opp sides //

OR

PQRT //ogram ✓ Both pairs opp sides // ✓

✓ parallelogram
✓ reasons (2)

2.2.2

a = 25° ✓ <s opp = sides ✓
b = 180 – 50 = 130° ✓ int <s in ΔHRT ✓
c = 50° ✓ co-int <s PQ//RT ✓
PQ = TR Prop //ogram ✓
d = 50° ✓ <s opp = sides ✓

✓ a
✓ reason
✓ b
✓ reason
✓ c
✓ reason
✓ PQ= TR prop //ogram
✓ d
✓ reason (9)

2.3

$80° + 2a + (2a + 38°) + (a + 12) = 360°$ ✓ int <s of quad ✓

$5a = 360 – 130$
$a = 46°$
$2b = 46 + 12$ Vert opp <s
$b = 29°$

✓ add < = 360
✓ int < of quad
✓ a = 46°
✓ Vert opp <s
✓ b = 29° (5)

2.4

$\hat{B}_1 = \hat{B}_2$
$\hat{C}_1 = \hat{C}_2$ ✓ <s bisect

$\hat{B}_1 + \hat{B}_2 + \hat{C}_1 + \hat{C}_2 = 180°$ ✓ Co-int < AB//DC ✓

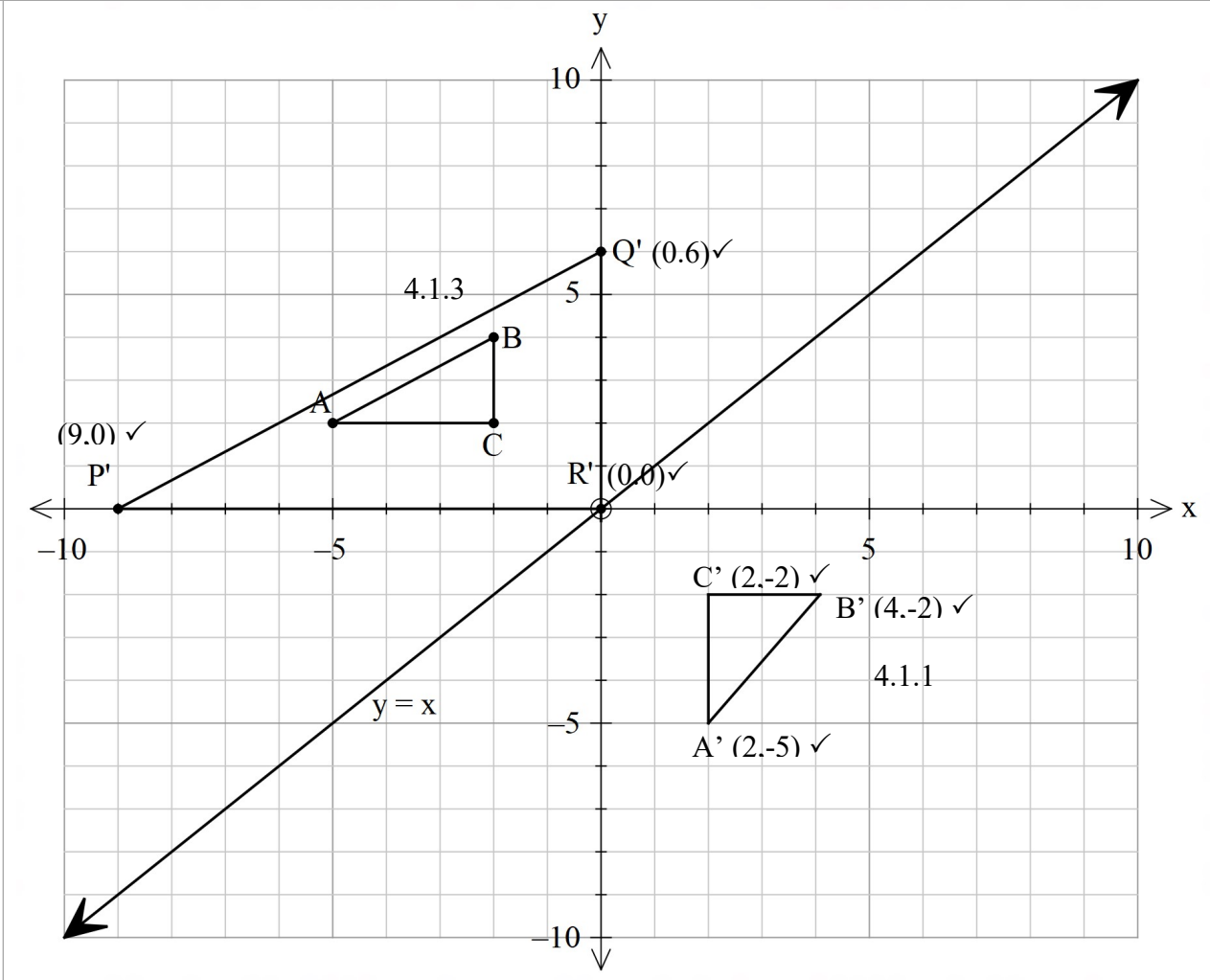
$\hat{C}_1 + \hat{B}_1 = 90°$ ✓

$\therefore \hat{T}_2 = 90°$ < in ΔTBC ✓

✓ <s B and C and reason
✓ Sum to 180 and coint <
✓ $\hat{C}_1 + \hat{B}_1 = 90°$
✓ Co-int < AB//DC
✓ < in ΔTCB (5)

[26]

Question 3				
3.1	$\hat{C}$ common $\hat{B} = \hat{E}$ $\hat{A} = \hat{D}$ ∴ ΔABC /// ΔDEC	Given ✓ Given ✓ < in Δ = 180 ✓ AAA✓	✓ C and reason ✓ B = E and reason ✓ A=D and reason ✓ Similar Δ AAA or equiangular	(4)
3.2	$x = 5$ ✓ $\frac{AB}{DE} = \frac{BC}{EC}$ $\frac{15}{3} = \frac{y+4}{4}$ ✓ $60 = 3y + 12$ $y = 16$ ✓ **or** BC = 4x5 = y+4 20 = y + 4 y = 16	Pythag ✓ ΔABC /// ΔDEC	✓ x=5 ✓ pythag ✓ BC = 20 or similarity ratio ✓ y = 16	(4)
				[8]
Question 4				
4.1.1	ZX = 3cm ✓ WZ = $\sqrt{5^2 - 3^2}$ =4cm ✓	(pythag) ✓	✓ ZX ✓ WZ = 4 ✓ Pythag	(3)
4.1.2	25cm **CA**		✓	(1)
4.1.3	$V_{rectangle}$ = 6.6.21 ✓ = 756 V_{tri}= (½ .6 ✓.6.4 ✓) = 72 V_{total}= 828cm^3 ✓	**CA for height**	✓ 6.6.21 substitute ✓ ½ .6.6.4 substitute ✓ for perp height 4 ✓ answer	(4)
4.1.4	V_{crate} = 25.18.24 = 10800cm^3 $V_{cartons}$ = 12(828) = 9936 cm^3 10800 – 9936 = 864 V_{empty} = 864 cm^3	**CA volume 12x____**	✓ 25.18.24 ✓ Multiply by 12 ✓ Answer 864	(3)
4.2.1	$M : \frac{9}{2}\pi a^2$ ✓ $N : 2\pi a^2$ ✓ $O : \frac{1}{2}\pi a^2$ ✓ ✓		✓ M ✓ N (2 or $\frac{4}{2}$) ✓ O Provide 2/3 marks if they work with full circle not half circles.	(3)
4.2.2	$(M - O) + N$ $4\pi a^2 + 2\pi a^2 = 6\pi a^2$ ✓		✓ **CA** Whole step ✓ answer	(2)
				[16]

Question 5			
5.1			
5.1.1	On graph A'= (2,-5) ✓ B'= (4,-2) ✓ C'=(2,-2) ✓	✓ X3	(3)
5.1.2	A(-5,2)→ P(-3,0) ✓ B(-2,4) → Q(0,2) ✓ C(-2,2) → R(0,0) ✓	✓ X3	(3)
5.1.3	On graph **CA following 5.1.2** P' = (-9,0) ✓ Q' = (0,6) ✓ R' = (0,0) ✓	✓ X3	(3)
5.1.4	1:1:9	✓	(1)
			[10]

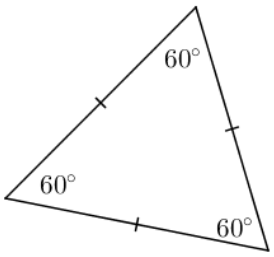
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GEC PILOT STUDY
MARKING GUIDELINE 2023
MATHEMATICS PAPER 2
GRADE 9

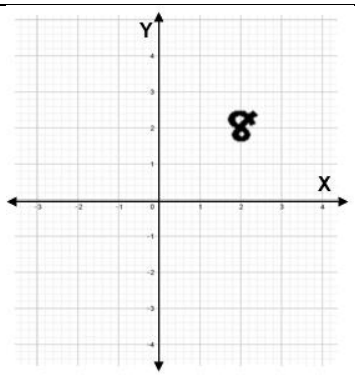
SECTION A

- *One mark per answer.*
- *There are no half marks.*

No.		Expected answer		Clarification
1.	C	It is vertically opposite to 88°.	✓	
2.	D	90°	✓	Lines are perpendicular.
3.	C	Corresponding angles.	✓	
4.	B	$55°$	✓	
5.	A	$54°$	✓	$3x + 2x = 90°$ …compl ∠s $5x = 90°$ $\frac{5x}{5} = \frac{90°}{5}$ $x = 18°$ $\text{E}\hat{\text{O}}\text{B} = 3x = 3(18°)$ $\text{E}\hat{\text{O}}\text{B} = 54°$
6.	B	$66°$	✓	$68^\circ + \hat{\text{E}} + 46^\circ = 180^\circ$ …sum of ∠s of a Δ $\hat{\text{E}} = 180^\circ - 68^\circ - 46^\circ$ $\hat{\text{E}} = 66^\circ$ $\hat{\text{E}} = f$ …alt ∠s; EB∥DC $\therefore f = 66°$ **OR** $\hat{\text{B}} + \hat{\text{C}} = 180^\circ$…co-int ∠$s$; EB∥DC $68^\circ + 46^\circ + f = 180^\circ$ $f = 180^\circ - 114^\circ$ $\therefore f = 66°$
7.	A	$10°$	✓	$20° + 55° + 2a - 15° = 180°$ …co-int ∠s ; MO∥PQ $2a + 60° = 180°$ $2a = 120°$ $a = 60°$

No.		Expected answer		Clarification
				$2b + 2a + 20° + a - 40° = 180°$ …sum of ∠s of a Δ $2b + 2(60°) + 20° + 60° - 40° = 180°$ $2b + 120° + 20° + 60° - 40° = 180°$ $2b = 180° - 160°$ $2b = 20°$ $\frac{2b}{2} = \frac{20°}{2}$ $b = 10°$
8.	A	one right angle and two acute angles.	✓	
9.	A		✓	
10.	A	The diagonals are perpendicular, one diagonal bisects the other and one diagonal bisects the angles at the vertices.	✓	
11.	D	A square is a rectangle.	✓	
12.	B	$95°$	✓	$\hat{A} + \hat{B} + \hat{C} = 180°$ …sum of ∠s of a Δ $= 180°$ $\hat{A} + 47° + 38° = 180°$ $\hat{A} = 180° - 47° - 38°$ $= 95°$
13.	A	$162°$	✓	$\hat{N}_1 = \hat{P}_1 = 35°$ …alt ∠s ; MN∥PQ $N\hat{O}Q = \hat{P}_1 + P\hat{N}O$ …ext. ∠ = sum of 2 opp int ∠s $= 35° + 127°$ $\therefore \quad y = 162°$ **OR** $y = M\hat{N}O$ …alt ∠s ; MN∥PQ $y = 35° + 127°$ $y = 162°$
14.	A	4 cm	✓	$\Delta ABC \| \| \Delta EFG$ …corr. $\angle s =$ $\frac{AB}{EF} = \frac{BC}{FG} = \frac{AC}{EG}$ …corr. sides are proportional $\frac{y}{8} = \frac{6}{12}$

No.		Expected answer		Clarification
				$y = \frac{6 \times 8}{12}$ ∴AB = 4 cm
15.	A	115°	✓	$E\hat{C}D = D\hat{E}C = y + 15°$ …∠s opp = sides $y + 15° + y + 65° = 180°$ …∠s on a straight line $2y + 80° = 180°$ $2y = 100°$ $y = 50°$ $\hat{E}_1 = y + 65°$ $= 50° + 65°$ $= 115°$ **OR** $\hat{B} = \hat{D} = y$ …opp.∠s of a rhombus = $\hat{E}_1 = \hat{C}_1 + \hat{D}$ …ext. ∠ = sum of 2 opp int ∠s $y + 65° = y + 15° + y$ $y = 50°$ $\hat{E}_1 = y + 65°$ $= 50° + 65°$ $= 115°$ **OR** $\hat{B} = \hat{D} = y$ …opp.∠s of a rhombus = $E\hat{C}D = D\hat{E}C = y + 15°$ …∠s opp = sides $E\hat{C}D + D\hat{E}C + \hat{D} = 180°$… sum of ∠s of Δ $y + 15° + y + 15° + y = 180°$ $3y = 150°$ $y = 50°$ $\hat{E}_1 = y + 65°$ $= 50° + 65°$ $= 115°$
16.	A	80°	✓	$\Delta RMS \equiv \Delta TMS$ …given $\therefore R\hat{M}S = T\hat{M}S$ …Δs congruent $x - 20° = 60°$ $x = 80°$
17.	D	16 cm	✓	In ΔNRQ and ΔNOM: $\hat{Q}_1 = \hat{M}_2$ …corr..∠s; QR ∥ MO $\hat{R}_1 = \hat{O}_1$ … corr..∠s; QR ∥ MO $\hat{N} = \hat{N}$ …common. ∠ or sum ∠s of Δ ΔNRQ⫼ΔNOM ∠∠∠ $\frac{NR}{NO} = \frac{RQ}{MO} = \frac{NQ}{NM}$ … corr. sides are proportional $\frac{9}{18} = \frac{8}{MO} = \frac{6}{12}$ ∴ MO = 16 cm **OR**

No.		Expected answer		Clarification
				$\widehat{M}_1 = \widehat{O}_1$ …alt.∠s ; NO ∥ MP $\widehat{R}_1 = \widehat{O}_1$ …corr.∠s; MO ∥ QR $\therefore\ \widehat{M}_1 = \hat{R}_1$ $\widehat{P} = \widehat{N}$ …opp. ∠s of a parm $\widehat{M}_2 = \widehat{O}_2$ …alt.∠s ; NO ∥ MP $\widehat{M}_2 = \widehat{Q}_1$ …corr∠s MO ∥ QR $\therefore\ \widehat{O}_2 = \widehat{Q}_1$ $\Delta NRQ \equiv \Delta PMO$ ∠∠∠ $PO = QN + QM = 12$ cm …opp.sides of a parm $NR = RO = 9$ cm …given In ΔPMO and ΔNRQ $\frac{MO}{RQ} = \frac{PM}{NR}$ …corr. sides are proportional $\frac{MO}{8} = \frac{18}{9}$ $MO = 2 \times 8$ $MO = 16$ cm
18.	C		✓	
19.	D	Q and R	✓	
20.	C	Translated 2 units to the left and 4 units up.	✓	
21.	A	$P(-2\ ;\ 7)$	✓	
22.	C	$Q'(1\ ;\ 5)$	✓	
23.	B	$(x; y) \rightarrow (-x\ ;\ y-1)$	✓	
24.	D	$A'(9\ ;\ -5)$ and $B'(2\ ;\ 1)$	✓	
25.	D	ΔKLM	✓	
26.	B	15 cm	✓	$5 \times 3 = 15$ cm
27.	B	$A = lb$	✓	

No.		Expected answer		Clarification
28.	B	the perimeter of a circle.	✓	
29.	D	$A = \pi r^2$	✓	
30.	B	15,88 cm	✓	$A = \pi r^2$ $198 = \pi r^2$ $r^2 = \frac{198}{\pi}$ $r = \sqrt{\frac{198}{\pi}}$ Diameter $= \sqrt{\frac{198}{\pi}} \times 2 =$ 15,88
31.	D	90	✓	$\text{AB} + \text{BC} + (\text{FE} + \text{DC}) + (\text{AF} + \text{ED})$ $= 20 + 25 + 20 + 25$ $= 90$
32.	C	48 cm^2	✓	TS $= (30 \div 10) = 3$ cm QS $= 6$ cm ... PR bisects QS Area of PQRS $= \frac{1}{2}$(PR $\times$ QS) $= \frac{1}{2}(16 \times 6) = 48$ cm^2 $= 48$ cm^2
33.	B	530 cm^2	✓	Radius $= 30 \div 2 = 15$ cm $A = \frac{3}{4}\pi r^2$ $A = \frac{3}{4}\pi(15)^2$ $A =$ 530 cm^2
34.	B	$20x$ cm	✓	$0{,}08x$ m $= 8x$ cm $\frac{8x}{2} = 4x$ and $\frac{6x}{2} = 3x$ …diagonals bisect at right angles $\therefore \text{EF}^2 = (3x)^2 + (4x)^2$ ...Pyth theorem $\text{EF}^2 = 9x^2 + 16x^2$ $\text{EF}^2 = 25x^2$ $\text{EF} = \sqrt{25x^2}$ $\text{EF} = 5x$ Perimeter $= (5x \times 4)$ Perimeter $= 20x$ cm
35.	D	13 times	✓	$r = 5 \div 2 = 2{,}5$ cm Perimeter of wheel $= 2\pi r$ $= 2\pi(2{,}5)$ $= 15{,}71$ cm 2 m $= 200$ cm Number of times the wheel turns $= 200 \div 15{,}71$ $= 12{,}73074475 \approx 13$ times

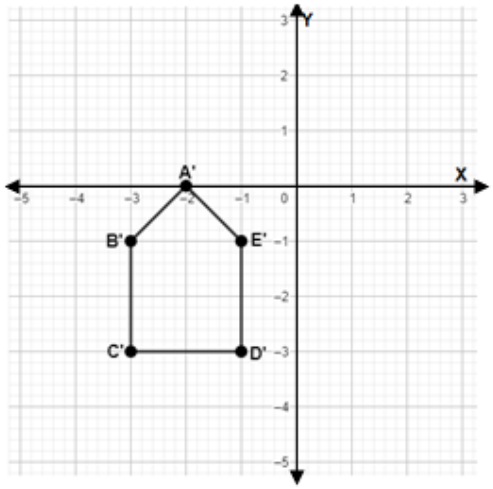
No.		Expected answer		Clarification
36.	C	40 mm	✓	$V = s^3$ $64 = s^3$ $s = 4$ cm $= 40$ mm
37.	D	248 cm^2	✓	$SA = 2[(6 \times 4) + (10 \times 4) + (10 \times 6)]$ $= 248$ cm^2
38.	A	1120 cm^2	✓	$SA = 2\left(\frac{1}{2} \times 8 \times 15\right) + (25 \times 15) + (17 \times 25) + (25 \times 8)$ $= 120 + 375 + 425 + 200$ $= 1120$ cm^2
39.	B	$\text{SA} = 2\pi r^2 + 2\pi rH$	✓	
40.	C	250 cm^3	✓	0,05 m = 5 cm $V = 5 \times 5 \times 10$ $= 250$ cm^3
41.	B	216 l	✓	400 mm = 40 cm and 600 mm = 60 cm $V = 90 \times 40 \times 60$ $= 216\,000$ cm^3 $= 216\ l$
42.	B	1,242 m^3	✓	90 cm = 0,9 m H of triangular prism = 1,4 – 0,9 = 0,5 $V = (0{,}9 \times 0{,}9 \times 1{,}2) + \left(\frac{1}{2} \times 0{,}9 \times 0{,}5 \times 1{,}2\right)$ $= 0{,}972 + 0{,}27$ $= 1{,}242$ m^3
43.	A	3,28 m^2	✓	Radius = 25 cm = 0,25 m Diameter = 25 x 2 = 50 cm = 0,5 m $SA = (0{,}5)(2{,}4) + [\pi(0{,}25)^2 + \pi(0{,}25)(2{,}4)]$ $= 1{,}2 + [0{,}20 + 1{,}88]$ $= 3{,}28$ m^2
44.	B	8,98%	✓	$V = \pi(90)^2(197)$ $V = 5\,013\,039{,}4$ cm^3 $5\,013\,039{,}4$ cm$^3 = 5\,013\ l$ Percentage of water in tank: $\frac{450}{5\,013} \times 100 = 8{,}98\%$
45.	B	150 mm	✓	h^2 of triangle $= \left(\sqrt{4100}\right)^2 - (40)^2$ $= 4100 - 1600$ $= 2500$ $h = 50$ mm Area of base $= \frac{1}{2} \times 80 \times 50$

No.		Expected answer		Clarification	
				$= 2000\ \text{mm}^2 = 20\ \text{cm}^2$ $300\ \text{ml} = 300\ \text{cm}^3$ $20\ \text{cm}^2 \times H = 300\ \text{cm}^3$ $H = 15\ \text{cm} = 150\ \text{mm}$ **OR** h^2 of triangle $= \left(\sqrt{4100}\right)^2 - (40)^2$ $= 4100 - 1600$ $= 2500$ $h = 50\ \text{mm} = 5\ \text{cm}$ Area of base $= \frac{1}{2} \times 8 \times 5$ $= 20\ \text{cm}^2$ $300\ \text{ml} = 300\ \text{cm}^3\ \ (1\ \text{ml} = 1\ \text{cm}^3)$ $20\ \text{cm}^2 \times H = 300\ \text{cm}^3$ $H = 15\ \text{cm} = 150\ \text{mm}$	
				Section A total	**45**

SECTION B

- Do not penalise the learner for the same mistake twice.
- *There are no half marks.*

MARKING CODES	
M	Method mark
A	Accuracy mark
CA	Consistent Accuracy mark

No.	Expected answer	Clarification	Mark
46.	 ✓✓✓**M**	Translating 5 units to the left: 1 mark Translating 1 unit up: 1 mark Correct quadrant: 1 mark	3
47.	$\widehat{0}_1 = x$ …vert opp ∠s ✓**M** $\widehat{0}_3 = 3x$ $\widehat{0}_5 = x$ $3x + 3x + x + x + x = 360°$ …angles around point ✓**M** $10x = 360°$ ✓**M** $\frac{10x}{10} = \frac{360°}{10}$ $x = 36°$ ✓**A** **OR** $\widehat{0}_3 = 3x$ …vert opp ∠s ✓**M** $3x + x + x = 180°$ …∠s on a str line AD✓**M** $5x = 180°$ ✓**M** $\frac{5x}{5} = \frac{180°}{5}$ $x = 36°$ ✓**A**	Statement and reason:1 mark Statement and reason:1 mark Simplification:1 mark Answer:1 mark **OR** Statement and reason:1 mark Statement and reason:1 mark Simplification:1 mark Answer:1 mark **Accept any other straight line used.**	4
48.	40 mm = 4 cm ✓**A** $A = \frac{1}{2}bh$ $100 = \frac{1}{2} \times 4 \times h$ ✓**M** $100 = 2h$ $h = 50$ cm ✓**A**	Correct conversion: 1 mark Substitution into the correct formula: 1 mark Answer: 1 mark	3

No.	Expected answer	Clarification	Mark
49.	$\hat{P} + 38° + 75° = 180°$…sum of ∠s of Δ ✓**M** $\hat{P} = 180° - 113°$ $\hat{P} = 67°$ ✓**CA** $\hat{T}_1 + 67° = 180°$…co-int ∠s PQ∥ST ✓**M** $\hat{T}_1 = 180° - 67°$ $\hat{T}_1 = 113°$ ✓✓**CA** **OR** $\hat{R}_1 = 75°$ …vert opp ∠s ✓**M** $\hat{S} = \hat{Q}$ …alt ∠s; PQ∥ST ✓**M** $\hat{S} = 38°$ ✓**A** $\hat{T}_1 = \hat{R}_1 + \hat{S}$ …ext ∠ = sum of 2 opp int ∠s ✓**M** $\hat{T}_1 = 75° + 38°$ $\hat{T}_1 = 113°$ ✓**CA** **OR** $\hat{P} + \hat{Q} + \hat{R}_2 = 180°$ …sum of ∠s of Δ ✓**M** $\hat{P} + 38° + 75° = 180°$ $\hat{P} = 180° - 113°$ $\hat{P} = 67°$ ✓**CA** $\hat{T}_2 = \hat{P}$ …alt ∠s; PQ∥ST ✓**M** $\hat{T}_2 = 67°$ $\hat{T}_1 + \hat{T}_2 = 180°$ …∠s on a str line ✓**M** $\hat{T}_1 + 67° = 180°$ $\hat{T}_1 = 180° - 67°$ $\hat{T}_1 = 113°$ ✓**CA**	Statement and reason: 1 mark Answer: 1 mark Statement and reason: 1 mark Answer: 2 marks Statement and reason: 1 mark Statement and reason: 1 mark Answer: 1 mark Statement and reason: 1 mark Answer: 1 mark **OR** Statement and reason: 1 mark Answer: 1 mark Statement and reason: 1 mark Statement and reason: 1 mark Answer: 1 mark **Accept any other correct responses.**	5

No.	Expected answer	Clarification	Mark
50.	OU = TO = 5 cm …diagonals of a parm bisect each other ✓**M/A** In ΔTON $ON^2 = TO^2 - TN^2$…Pyth theorem ✓**M** $= (5)^2 - (4)^2$ ✓**M** $= 25 - 16$ ✓**M** $= 9$ cm^2 $ON = 3$ cm ✓**CA**	Statement and reason: 1 mark Statement and reason: 1 mark Substitution: 1 mark Simplification: 1 mark Answer: 1 mark	5
51.	Volume of the room $V = l \times b \times h$ $V = 5 \times 3 \times 2$ $V = 30$ m^3 ✓**A** Volume of the box $V = l \times b \times h$ $V = 10 \times 6 \times 4$ $V = 240$ cm^3 ✓**A** $V = 0{,}00024$ m^3 ✓**A** Number of boxes $= \frac{30}{0{,}00024}$ Number of boxes $= 125\ 000$ ✓**CA** **OR** Volume of the room $V = l \times b \times h$ $V = 5 \times 3 \times 2$ $V = 30$ m^3 ✓**A** $V = 3000000$ cm^3 ✓**A** Volume of the box $V = l \times b \times h$ $V = 10 \times 6 \times 4$ $V = 240$ cm^3 ✓**A** Number of boxes $= \frac{3000000}{240}$ Number of boxes $= 125\ 000$ ✓**CA**	Answer: 1 mark Answer: 1 mark Conversion: 1 mark Answer: 1 mark **OR** Answer: 1 mark Conversion: 1 mark Answer: 1 mark Answer: 1 mark **Accept any other correct responses.**	4

No.	Expected answer	Clarification	Mark
52.	Angle formed by the ray of light to the top of the flag pole and the horizontal line from the light source to the pole, is common. ✓**M**	Identifying the common angle: 1 mark	6
	Angle between the wooden beam and the horizontal line from the light source to the pole = angle formed by the flag pole and the horizontal line from the light source $= 90^0$. ✓**M**	Identifying the angles $= 90^0$: 1 mark	
	∴ Angle formed by the ray of light and wooden beam = angle formed by the ray of light and the flag pole. ✓**M**	Concluding 3rd angles =: 1 mark	
	The triangles formed by the light source, wooden beam and flag pole are similar.		
	$\frac{10}{110} = \frac{18}{x}$ ✓**M** $10x = 1980$ $\frac{10x}{10} = \frac{1980}{10}$ $x = 198$ from the height of the light source ✓**M** $h = 198 + 2$ $h = 200$ m ✓**A**	Proportion: 1 mark Answer: 1 mark Answer: 1 mark	
		Section B total	**30**