GAUTENG PROVINCE
EDUCATION
REPUBLIC OF SOUTH AFRICA

PREPARATORY EXAM

2026

MARKING GUIDELINES

MATHEMATICS PAPER 1 (10611)

22 pages

NOTE:

- If a candidate answers a question TWICE, mark only the *FIRST* attempt.
- If a candidate DEADLINES the answer to a question and does not redo it, mark the deadline attempt.
- Consistent accuracy (SA) is applied in ALL aspects of the marking guidelines.
- Assuming values/answers to solve a problem is UNACCEPTABLE.
- (A) – refers to an accuracy point.

QUESTION 1

1.1.1	$3x^2 - x + 2 = x + 2$ $3x^2 - 2x = 0$ $x(3x - 2) = 0$ $x = 0$ or $x = \frac{2}{3}$	✓ standard form ✓ factors ✓ both answers	(3)
1.1.2	$7x^2 - x - 2 = 0$ $x = \frac{-(-1) - \sqrt{(-1)^2 - 4(7)(-2)}}{2(7)}$ $x = 0.61$ or $x = -0.47$ **NOTE: Penalize one point for incorrect rounding in this question.**	✓ correct substitution ✓ answer ✓ answer	(3)
1.1.3	$(\frac{1}{2})^{2} - 5 + 24 \leq 0$ $\frac{2}{4} - 5 + 24 \leq 0$ $2 - 20 + 96 \leq 0$ $(\ - 8)(\ - 12) \leq 0$ + - + 8 12 $8 \leq \ \leq 12$	✓ square fraction ✓ standard form ✓ critical values ✓✓ answer (combination point)	(5)
1.1.4	$2^{-x+2} - 2^{-x} = 48$ $2^{-x}(2^2 - 1) = 48$ $2^{-x} = 16$ $2^{-x} = 2^4$ $x = -4$ **OR** $= 2^{-}$ $4 - \ = 48$ $3 = 48$ $= 16$ $\therefore 2^{-} = 16$ $2^{-} = 2^4$ $= -4$	✓ factorize GGF ✓ simplified to equal bases ✓ answer for x ✓ set up comparison according to. ✓ simplified to equal bases ✓ answer for x	(3)

1.2	$\sqrt{2x+1}-2=y$ $x=4y...(1)$ $2x+1=(y+2)^2$ $2x+1=y^2+4y+4$ ...(2) replace (1) in (2) $2(4y)+1=y^2+4y+4$ $8y+1=y^2+4y+4$ $0=y^2-4y+3$ $0=(y-3)(y-1)$ $y=3$ or $y=1$ $x=12$ or $x=4$ OR**F** $\sqrt{2x+1}-2=y...(1)$ $x=4y...(2)$ replace (2) in (1) $\sqrt{2(4y)+1}-2=y$ $\sqrt{8y+1}=y+2$ $8y+1=y^2+4y+4$ $0=y^2-4y+3$ $0=(y-3)(y-1)$ $y=3$ or $y=1$ $x=12$ or $x=4$	✓ isolate root ✓ square ✓ substitution ✓ standard form ✓ both y-values ✓ both x-values ✓ substitution ✓ isolate root ✓ square ✓ standard form ✓ both y-values ✓ both x-values	(6)
1.3.1	$b=-5$ $-4ac=56a$ $c=-14$ $0=axe^2-5x-14$ $0=(x-7)(axe+2)$ $0=axe^2-7axe+2x-14$ $-7axe=-7x$ $a=1$ **OR**	✓ $=-5$ ✓ drafting of comparison ✓ value for c ✓ setting up an equation ✓ value for a	

	$= -5$ $-4 = 56$ $= -14$ $\frac{5+\sqrt{25+56}}{2} = 7$ $\sqrt{25+56} = 14 - 5$ $25 + 56 = 196 - 140 + 25$ $196^2 - 196 = 0$ $196(-1) = 0$ $\neq 0$ or $= 1$ **OR** $axe^2+bx+c=0$ $49a+7b+c=0$...(1) $x=\frac{5-\sqrt{25+56a}}{2a}$ $-b=5$ $b=-5$ $b^2-4ac=25+56a$ $(5)^2-4ac=25+56a$ $-4ac=56a$ $c=-14$ from (1) $49a-49=0$ $a=1$ **OR** $b=-5$ $-4ac=56a$ $c=-14$ $0=a(7)^2-5(7)-14$ $49a-35-14=0$ $a=1$	✓ $= -5$ ✓ drafting of comparison ✓ value for c ✓ substitution ✓ value for a ✓ drafting of comparison ✓ $= -5$ ✓ substitution ✓ value for c ✓ value for a ✓ $= -5$ ✓ drafting of comparison ✓ value for c ✓ substitution ✓ value for a	(5)
1.3.2	$x = -2$	✓ answer	(1)

[26]

QUESTION 2

2.1	7 sentence 30- ; 7; 23syn 30- ; 17... $\frac{7}{2}$; 7 ; $\frac{23}{2}$; 17 $\frac{7}{2}$ $\frac{9}{2}$ $\frac{11}{2}$ 1 1 2*the*Differences = 1 the pattern is square	✓ row ✓ first differences ✓ 2*the*differences	(3)
2.2	$3a+b=\frac{7}{2}$ $3\left(\frac{-1}{-2}\right)+b=\frac{7}{2}$ $b=2$ $p=2$ $a+b+c=\frac{7}{2}$ $\frac{1}{2}+2+c=\frac{7}{2}$ $c=1$ $q=1$ **NOTE: FULL MARKS if in terms of *b* and *c* left.** **Answer only, NO MARKS.**	✓ substitution ✓ substitution	(2)
2.3	$49=\frac{1}{2}a^2+2a+1$ $0=a^2+4a-96$ $0=(a+12)(a-8)\ a$ $a=-12$ or $a=8$	✓ equate to 49 ✓ standard form ✓ factors ✓ both answers with rejection.	(4)

2.4	$x = \frac{-2}{2\left(-\frac{1}{2}\right)}$ $x = -2$ The minimum value of the function occurs where, $x = -2$, but $a \neq -2$ since $a \in A$. OR $y = \frac{1}{2}x^2 + 2x + 1$ $\frac{dy}{dx} = x + 2$ $0 = x + 2$ $x = -2$ The minimum value of the function occurs where, $x = -2$, but $a \neq -2$ since $a \in A$. **OR** A valid explanation is as follows: The learner is wrong because A **number sequence** proposal and therefore only **positive integers** can be. The turning point of the quadratic function gives the minimum value of the **function** for all real values of , but not necessarily the minimum term of the pattern. Therefore, the minimum value of the pattern must be determined by the allowed values of to investigate. Since the line from = 1 increases, the minimum term of the pattern is: $T_1 = \frac{1}{2}(1)^2 + 2(1) + 1$ $= 3.5$ The turning point of the function cannot therefore be used to determine the minimum term of the pattern, because the turning point is at an inadmissible value of prevent. **NOTE: The explanation must support** **is determined by a valid calculation of the turning point of the quadratic function in question.** **In the second option, the = 0 for the first point may be implied.**	✓ $x = \frac{-b}{2a}$ calculation ✓ value for x ✓ valid explanation ✓ derivative = 0 ✓ value for x ✓ valid explanation ✓ valid explanation ✓ calculation of T_1 ✓ valid explanation	(3)

[12]

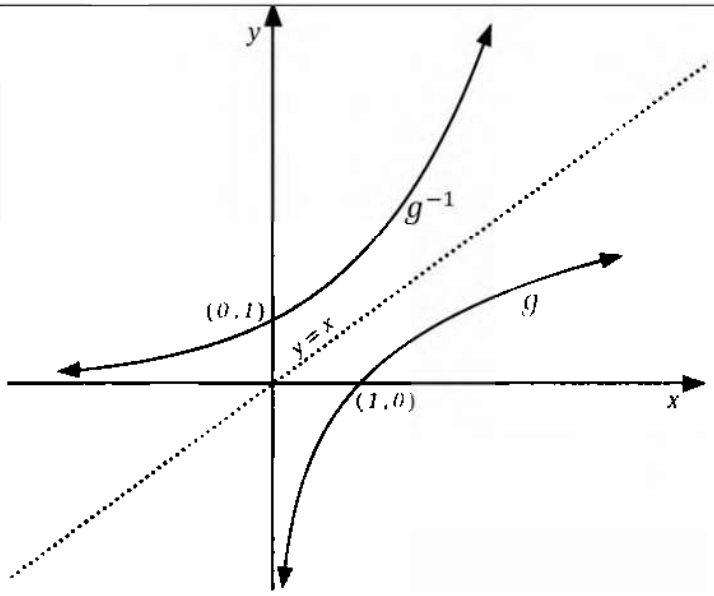
QUESTION 3

3.1.1	$r = \frac{2}{3}x; \quad x \neq 0$ $-1 < r < 1$ $-1 < \frac{2}{3}x < 1$ $-\frac{3}{2} < x < \frac{3}{2}$ **NOTE: $x \neq 0$ may be implied.**	✓ $r = x\frac{2}{3}$ ✓ answer (A)	(2)
3.1.2	$3 + 1 + \frac{1}{3}$ $r = \frac{1}{3}$ $S_\infty = \frac{3}{1-\frac{1}{3}}$ $S_\infty = \frac{9}{2}$ OhOhFF $S_\infty = \frac{3}{1-\frac{2-1-}{3-2-}}$ $S_\infty = \frac{9}{2}$	✓ value for r ✓ substitution ✓ answer ✓✓ substitution ✓ answer	(3)

3.2.1	$B_a = \sum_{k=1}^{a} 24\left(\frac{-3}{2}\right)^{k}$ 36; 54; 81 $a=36 \qquad r=\frac{3}{2}$ $S_n=\frac{36\left(\frac{-3}{2}^{a}-1\right)}{\frac{3}{2}-1}$ $S_n=72\left(\frac{-3}{2}^{a}-1\right)$ **NOTE:** answer only, 0 points	✓ values for a and r ✓ substitution	(2)
3.2.2	$A_{18}-B_a=\frac{423}{8}$ A: −15 ; −8 ; −1 a $= -15 \qquad d=7$ $S_{18}=\frac{18}{2}[2(-15)+(18-1)(7)]$ $S_{18}=801$ $801-72\left(\frac{-3}{2}^{a}-1\right)=\frac{423}{8}$ $\left(\frac{-3}{2}\right)^{a}=\frac{729}{64}$ $\left(\frac{-3}{2}\right)^{a}=\left(\frac{-3}{2}\right)^{6}$ $a=6$	✓ values for a and d ✓ substitution ✓ answer ✓ substitution ✓ simplification ✓ answer	(6)
			[13]

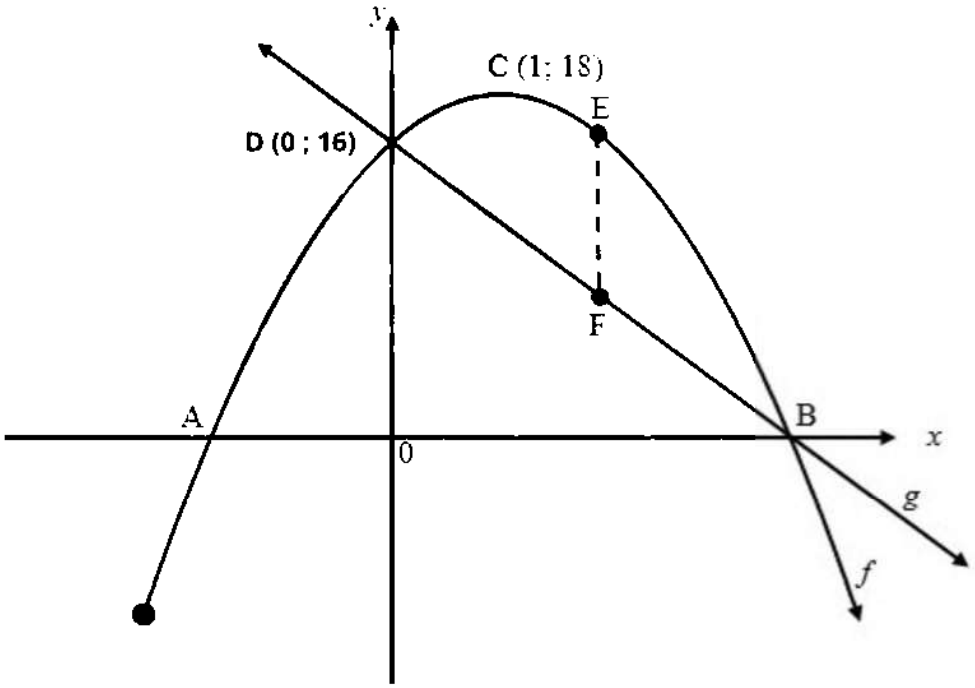
QUESTION 4

4.1	$p = -2$ $q = 3$ **NOTE: Answers may NOT be in terms of x and y is NOT given.**	✓ value for p ✓ value for q	(2)
4.2	$y = x + t$ replace (2 ; 3) 3 $= 2 + t$ $t = 1$ **OR** Axis of symmetry with positive slope $= -2 + 3$ $= +1$ $= 1$ **NOTE: Answer only, FULL MARKS.**	✓ substitution in comparison ✓ value for t ✓ substitution in comparison ✓ value for t	(2)
4.3	$y = \frac{-2}{x-2} + 3$ $h(x) = \frac{-2}{x} + 6$ $x - 6 = \frac{-2}{y}$ $y = \frac{-2}{x-6}$	✓ $\frac{-2}{x}$ ✓ + 6 ✓ comparison of h	(3)

4.4.1	$g(x) = \log_2$ $xyz=\log_2 x$ $x=\log_2 y$ $y=2^x$ **NOTE: Answer only, FULL MARKS.**	✓ exchange of x and y ✓ answer	(2)
4.4.2		✓ rising ( )with asymptote $x=0$ ✓ y-section of g^{-1} and x-section of g ✓ rising $^{-1}$( )with asymptote $y=0$ ✓ one additional point on both graphs	(4)
4.4.3	$0 < x < 1$ **OR** $x \in (0;1]$	✓✓answer (combination point)	(2)

[15]

QUESTION 5



5.1	$f(x) = a(x-1)^2+18$ $16 = a(0-1)^2+18$ $16 = a+18$ $a = -2$ $f(x) = -2(x-1)^2+18$ $f(x) = -2(x^2-2x+1)+18$ $f(x) = -2x^2+4x-2+18$ $f(x) = -2x^2+4x+16$	✓ subst (1;18) ✓ subst (0;16) ✓ value for a ✓ simplification of square two-term	(4)
5.2	$f(x) = -2x^2+4x+16$ 0 $= x^2-2x-8$ 0 = $(x+2)(x-4)$ $x = -2$ or $x = 4$ $AB = 6$ units	✓ ( ) = 0 ✓ answer	(2)

5.3	$m = \frac{16 - 0}{0 - 4}$ $m = -4$ $g(x) = -4x + 16$ **OR** $y = mx + 16$ $0 = 4m + 16$ $m = -4$ $g(x) = -4x + 16$	✓ gradient ✓ answer ✓ gradient ✓ answer	(2)
5.4.1	$-4 \leq x \leq 1$ **OR** $x \in [-4;1)$ **Accept** $-4 \leq x \leq 1$ or $x \in [-4; 1]$	✓✓ answer	(2)
5.4.2	$1 < x < 4$ or $-4 < x < -2$ **OR** $x \in (1; 4)$ or $[-4;-2)$	✓ $1 < x < 4$ ✓ $-4 \leq x < -2$	(2)

5.5	$f(x) - g(x)$ $= -2x^2 + 4x + 16 - (-4x + 16) = -2x^2 + 8x$ EF_{MAX} Derivative=0 $-4x + 8 = 0$ $4x = 8$ $x = 2$ $-2(2)^2 + 8(2)$ =8 units OR**OR** $f(x) - g(x)$ $= -2x^2 + 4x + 16 - (-4x + 16) = -2x^2 + 8x$ $x = \frac{-b}{2a} = \frac{-8}{2(-2)}$ $x = 2$ $-2(2)^2 + 8(2)$ =8 units OR**OR** $f(x) - g(x)$ $= -2x^2 + 4x + 16 - (-4x + 16) = -2x^2 + 8x$ $-2(x^2 - 4x + 2^2 - 2^2) =$ $-2(x-2)^2 + 2(2)^2$ $= -2(x-2)^2 + 8$ 8 units	✓ EF = $f(x)$-$g(x)$ ✓ answer in terms of x ✓ derivative = 0 ✓ value for x ✓ answer ✓ EF = $f(x)$–$g(x)$ ✓ answer in terms of x ✓ noun in $\frac{-b}{2a}$ ✓ value for x ✓ answer ✓ EF = $f(x)$-$g(x)$ ✓ answer in terms of x ✓ complete square ✓ simplify expression ✓ answer	(5) **[17]**

QUESTION 6

6.1	$A=P(1+i)^a$ $78\,000 = 39\,000(1 + 0.18)^a$ $2 = (1 + 0.18)^a$ $\log_{(1+0.18)}2 = a$ n = 4,187 years year 2031	✓ substitution ✓ use of logs ✓ value for a ✓ answer	(4)
6.2.1	$Fv = \frac{x[(1+i)^a - 1]}{i}$ $Fv = \frac{3\,200\left[\left(1+\frac{0.0975}{12}\right)^{240} - 1\right]}{\frac{0.0975}{12}}$ Fv=R2 352 649,68	✓ value for i and a ✓ substitution in correct formula ✓ R2 352 649,68	(3)
6.2.2	240 × R3 200 = R768 000 $\frac{768,000}{2\,352\,649,68} \times 100$ = 32.64 % 67.36% of the total investment is interest. **OR** 240 × R3 200 = R768 000 R2 352 649,68 – R768 000 = R1 584 649,68 $\frac{1584\,649.68}{2\,352\,649,68} \times 100$ = 67.36%	✓ R768 000 ✓ 32.64% ✓ 67.36% ✓ R768 000 ✓ R1 584 649,68 ✓ 67.36%	(3)

6.2.3	$Pvt = \frac{x\left(1 - \frac{1}{1+i}^{-a}\right)}{i}$ $1\,200\,000 = \frac{x\left[1 - \frac{1}{1 + \frac{0.1137}{12}}^{-240}\right]}{\frac{0.1137}{12}}$ x=R12 689,84 Yes, she will be able to afford to buy the property. OR $Pvt = \frac{x\left(1 - \frac{1}{1+i}^{-a}\right)}{i}$ $= \frac{13\,000\,(1 - [1 + \frac{0.1137}{12}]^{-240})}{\frac{0.1137}{12}}$ = 1229330.40 Yes, she will be able to afford to buy the property.	✓ values for i and a ✓ substitution in correct formula ✓ R12 689,84 ✓ deduction ✓ values for i and a ✓ substitution in correct formula ✓ R1229330.40 ✓ deduction	(4)

[14]

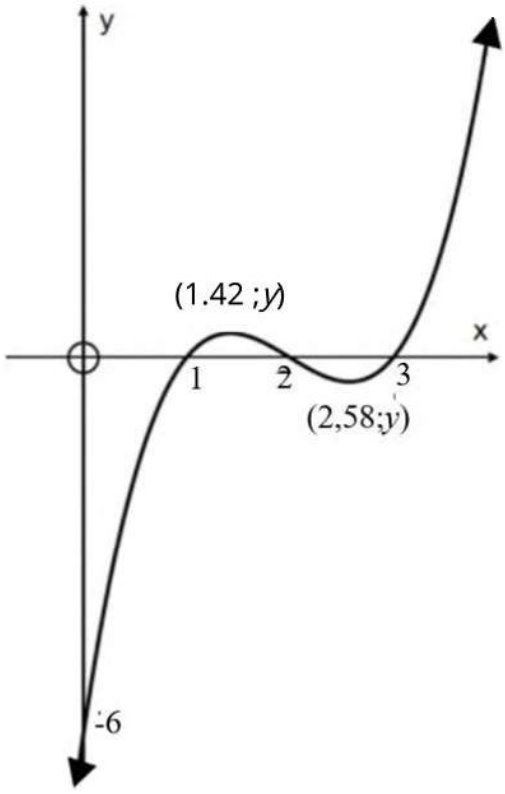
QUESTION 7

7.1	$f(x) = -x+2x^2$ $f(x+h) = -(x+h) + 2(x+h)^2$ $f(x+h) = -x-h+2(x^2+ 2xh+h^2)$ $f(x+$ $h) = -x-h+2x^2+ 4xh+2h^2$	✓ $f(x+h)$	
	$f'(x) = \lim_{h\to 0} \frac{f(x+h) - f(x)}{h}$ $f'(x) = \lim_{h\to 0} \frac{-x-h+2x^2+ 4xh+2h^2- (-x+2x^2)}{h}$ $f'(x) = \lim_{h\to 0} \frac{-x-h+2x^2+ 4xh+2h^2+x-2x^2}{h}$ $f'(x) = \lim_{h\to 0} \frac{-h+4xh+2h^2}{h}$ $f'(x) = \lim_{h\to 0} \frac{h(-1+ 4x+2h)}{h}$ $f'(x) = \lim_{h\to 0}(-1+ 4x+2h)$ $f'(x) = -1+ 4x$	✓ substitution ✓ simplification ✓ factorization ✓ answer	
	OR		
	$f'(x) = \lim_{h\to 0} \frac{f(x+h) - f(x)}{h}$ $f'(x) = \lim_{h\to 0} \frac{-(x+h) + 2(x+h)^2- (-x+2x^2)}{h}$ $f'(x) = \lim_{h\to 0} \frac{-x-h+2x^2+ 4xh+2h^2- (-x+2x^2)}{h}$ $f'(x) = \lim_{h\to 0} \frac{-x-h+2x^2+ 4xh+2h^2+x-2x^2}{h}$ $f'(x) = \lim_{h\to 0} \frac{-h+4xh+2h^2}{h}$ $f'(x) = \lim_{h\to 0} \frac{h(-1+ 4x+2h)}{h}$ $f'(x) = \lim_{h\to 0}(-1+ 4x+2h)$ $f'(x) = -1+ 4x$	✓ substitution ✓ $f(x+h)$ ✓ simplification ✓ factorization	
	NOTE: Penalize ONE point for incorrect notation in this question.	✓ answer	(5)

7.2	$y=2x^3-6x^2+1$ $\frac{dy}{dx}=6x^2-12x$	✓ $6x^2$ ✓ $-12x$	(2)
7.3	$f(x)=\frac{\sqrt{x}}{x}-9x \qquad g(x)=-16x$ $D_x[f(x)+\frac{1}{2}g(x)]$ $D_x[\frac{\sqrt{x}}{x}-9x+\frac{1}{2}(-16x)]$ $D_x[x^{\frac{1}{2}}x^{-1}-9x-8x]$ $D_x[x^{-\frac{1}{2}}-17x]$ $=-\frac{1}{2}x^{-\frac{3}{2}}-17$	✓ substitution ✓ $-\frac{1}{2}$ ✓ -17 ✓ first term correctly differentiated if exponent is negative ✓ second term correctly differentiated	(5)
			[12]

QUESTION 8

8.1	$f(x)=x^3-axe^2+bx-6$ $f'(x)$ $=3x^2-2axe+brother''(x)$ $=6x-2off'(2)=6(2)-2a$ $=0\ 12=2a$ $a=6$ $f'(x)=3x^2-2(-(6))x+b\ 26$ $=3(-1)^2+12(-1)+b$ $b=11$	✓ $f'(x)$ ✓ $f''(x)=0$ the 0 can be implied ✓ substitution of $=2$ ✓ subst $(-1;26)$ in $f'(x)$	(4)
8.2	$f(x)=x^3-6x^2+11x-6$ $f(x)$ $=(x-1)(x^2-5x+6)$ $f(x)=($ $x-1)(x-2)(x-3)$ $x=1$ or $x=$ 2 or $x=3$ **Accept any method**	✓ trinomial ✓ factors ✓ both others x-values	(3)

8.3	$f(x) = x_3 - 6x_2 + 11x - 6$ $f'(x) = 3x_2 - 12x + 11$ $0 = 3x_2 - 12x + 11$ $x = \frac{-(-12) - \sqrt{(-12)_2 - 4(3)(11)}}{2(3)}$ $x = \frac{6 - 3\sqrt{}}{3}$ x-2.58 or x=1, 42	✓ derivative = 0 ✓ substitution in quadratic formula ✓ answer with selection	(3)
8.4	$f''(x) = 6x - 12$ $f''(4) = 6(4) - 12$ $f''(4) = 12$ $f''(x)$ - 0- concave up	✓ noun x=4 in $''(\ )$ ✓ answer ✓ interpretation	(3)
8.5		✓ form ✓ all intersections ✓ both turning points	(3)
8.6	$f'(x) = 3x_2 - 6x + 11$ $f'(0) = 11$ $y = 11x - 6$	✓ m=11 ✓ answer	(2)

[18]

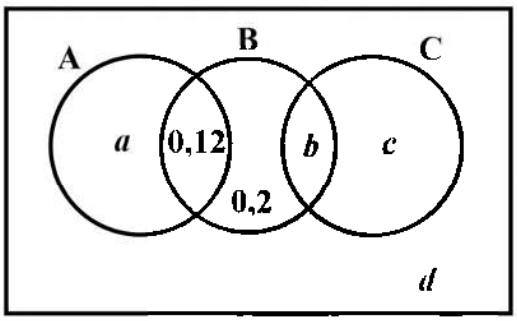
QUESTION 9

9.1	Horizontal length = $2x$ Vertical length $= g(x) - f(x)$ $= -x^2 + 12 - \left(-\frac{1}{2}x^2 - 6\right)$ $= -\frac{3}{2}x^2 + 18$	✓ horizontal length = $2x$ ✓ $g(x) - f(x)$ ✓ $= -\frac{3}{2}x^2 + 18$	(3)
9.2	$A(x) = 2x\left(-\frac{3}{2}x^2 + 18\right)$ $A(x) = -3x^3 + 36x$ $A'(x) = -9x^2 + 36$ 9 $x^2 - 36 = 0$ $9(x^2 - 4) = 0$ $(x-2)(x+2) = 0$ $x = 2$ or $x = -2$ $A(2) = -3(2)^3 + 36(2)$ $A = 48$ units^2 **NOTE: derivative = 0 Must be indicated and may not be implied.**	✓ expression setting ✓ simplification of expression ✓ derivative = 0 ✓ both values of x ✓ answer	(5)

[8]

QUESTION 10

10.1.1	( ) = 0	✓ answer	(1)
10.1.2	$P(B \text{ and } C) = P(B) - P(C)\ P(B \text{ and } C) = 0.4-0.2$ $P(B \text{ and } C) = 0.08 \text{ or } \frac{2}{25}$	✓ 0.4×0.2 ✓ answer	(2)



10.2	a=0.18 or $\frac{9}{50}$ b=0.08 or $\frac{2}{25}$ c=0.12 or $\frac{3}{25}$ d=0.3 or $\frac{3}{10}$	✓ value of a ✓ value of b ✓ value of c ✓ value of d	(4)

[7]

QUESTION 11

11.1	9! =362,880	✓ 9! ✓ answer (9! or 362 880)	(2)
11.2.1	3! - 7! =30 240 $P(together) = \frac{3!- 7!}{9!}$ $P(together) = \frac{30\ 240}{362,880}$ $P(together) = \frac{1}{12}$ **OR** 3! - 11! =239500800 $P(together) = \frac{3! - 11!}{13!}$ $P(together) = \frac{1}{26}$	✓ 3! - 7! ✓ method (divide by 9!) ✓ answer **OR** ✓ 3! - 11! or 239500800 ✓ method (divide by 13!) ✓ answer	(3)
11.2.2	Total! – together! = 9! – (2! × 8!) = 282 240 OR Total! – together! =13! – (2! × 10!) =62 197 632 000	✓ method ✓ 2! x 8! ✓ answer ✓ method ✓ 2! x 10! ✓ answer	(3)

[8]

TOTAL: 150