

SA's Leading Past Year

Exam Paper Portal



You have Downloaded, yet Another Great Resource to assist you with your Studies 😊

Thank You for Supporting SA Exam Papers

Your Leading Past Year Exam Paper Resource Portal

Visit us @ www.saexampapers.co.za



**SA EXAM
PAPERS**
SA EXAM
PAPERS



Province of the
EASTERN CAPE
EDUCATION



**NATIONAL
SENIOR CERTIFICATE /
NASIONALE
SENIOR SERTIFIKAAT**

GRADE/GRAAD 12

JUNE/JUNIE 2024

**MATHEMATICS P1 MARKING GUIDELINE/
WISKUNDE V1 NASIENRIGLYN**

MARKS/PUNTE: 150

This marking guideline consists of 17 pages./
Hierdie nasienriglyn bestaan uit 17 bladsye.



SA EXAM
PAPERS

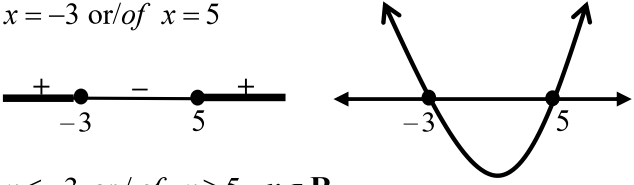
NOTE/LET OP:

- If a candidate answered a question TWICE, mark the FIRST attempt ONLY.
Indien 'n kandidaat 'n vraag TWEE keer beantwoord het, merk SLEGS die EERSTE poging.
- Consistent accuracy(CA) applies in ALL aspects of the memorandum.
Volgehoue akkuraatheid geld deurgaans in ALLE aspekte van die memorandum.
- If a candidate crossed out an attempt of a question and did not redo the question, mark the crossed-out attempt.
Indien 'n kandidaat 'n poging vir 'n vraag deurgetrek het en nie die vraag weer beantwoord het nie, merk die poging wat deurgetrek is.
- The mark for substitution is awarded for substitution into the correct formula.
Die punt vir substitusie word toegeken vir substitusie in die korrekte formule.

QUESTION 1/VRAAG 1

1.1.1	$x^2 - 8(x - 2) = 25$ $x^2 - 8x + 16 - 25 = 0$ $x^2 - 8x - 9 = 0$ $(x + 1)(x - 9) = 0$ $x + 1 = 0 \text{ or/of } x - 9 = 0$ $x = -1 \text{ or/of } x = 9$ <p style="text-align: center;">OR / OF</p> $x^2 - 8x - 9 = 0$ <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;"> Answers only – Full marks Slegs antwoorde – Volpunte </div> $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ $= \frac{-(-8) \pm \sqrt{(-8)^2 - 4(1)(-9)}}{2(1)}$ $= \frac{8 \pm \sqrt{100}}{2}$ $x = -1 \text{ or/of } x = 9$	<ul style="list-style-type: none"> ✓ standard form / <i>standaardvorm</i> ✓ factors / <i>faktore</i> ✓ both answers / <i>beide antwoorde</i> <p style="text-align: right;">(3)</p> <p style="text-align: center;">OR / OF</p> <ul style="list-style-type: none"> ✓ standard form / <i>standaardvorm</i> ✓ correct substitution into correct formula / <i>korrekte vervanging in korrekte formule</i> ✓ both answers / <i>beide antwoorde</i> <p style="text-align: right;">(3)</p>
1.1.2	<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;"> Penalise 1 mark for incorrect rounding off./ Penaliseer 1 punt vir verkeerde afronding. </div> $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ $x = \frac{-(2) \pm \sqrt{(2)^2 - 4(-3)(2)}}{2(-3)}$ $x = \frac{-2 \pm \sqrt{28}}{-6}$ $\therefore x = -0,55 \text{ or/of } x = 1,22$	<ul style="list-style-type: none"> ✓ substitution / <i>vervanging</i> ✓✓ <i>x-values / x-waardes</i> <p style="text-align: right;">(3)</p>



1.1.3	$(x+3)(5-x) \leq 0$ $(x+3)(x-5) \geq 0$ <p>critical values/kritieke waardes</p> $x = -3 \text{ or/of } x = 5$  $x \leq -3 \text{ or/of } x \geq 5, x \in \mathbf{R}$ <p style="text-align: center;">OR/OF</p> $x \in (-\infty; -3] \text{ or/of } x \in [5; \infty), x \in \mathbf{R}$	<p>✓ critical values / kritieke waardes</p> <p>✓✓ $x \leq -3$ or/of $x \geq 5, x \in \mathbf{R}$ (accuracy / akkuraatheid)</p> <p style="text-align: center;">OR/OF</p> <p>$x \in (-\infty; -3] \text{ or/of } x \in [5; \infty), x \in \mathbf{R}$</p> <p style="text-align: right;">(3)</p>
1.1.4 (a)	$x \leq -5, x \in \mathbf{R}$	<p>✓✓ answer / antwoord</p> <p style="text-align: right;">(2)</p>
1.1.4 (b)	$x+3 = \sqrt{x+5}$ $(x+3)^2 = (\sqrt{x+5})^2$ $x^2 + 6x + 9 = x + 5$ $x^2 + 5x + 4 = 0$ $(x+1)(x+4) = 0$ $\therefore x = -1 \text{ or/of } x = -4$	<p>✓ isolating surd / isoleer wortelvorm</p> <p>✓ square both sides / kwadreer beide kante</p> <p>✓ standard form / standaardvorm</p> <p>✓ selection / keuse</p> <p style="text-align: right;">(4)</p>



1.2	$y + 2x = 5 \dots\dots\dots (1)$ $2x^2 - xy - 4y^2 = 8 \dots\dots(2)$ <p>From / Vanaf (1): $y = -2x + 5 \dots\dots\dots(3)$</p> <p>(3) into/in (2):</p> $2x^2 - x(-2x + 5) - 4(-2x + 5)^2 = 8$ $2x^2 - x(-2x + 5) - 4(4x^2 - 20x + 25) - 8 = 0$ $2x^2 + 2x^2 - 5x - 16x^2 + 80x - 100 - 8 = 0$ $-12x^2 + 75x - 108 = 0$ $4x^2 - 25x + 36 = 0$ $(4x - 9)(x - 4) = 0$ $x = \frac{9}{4} \text{ or/of } x = 4$ $y = \frac{1}{2} \text{ or/of } y = -3$	<p>✓ $y = -2x + 3$</p> <p>✓ substitution / <i>vervanging</i></p> <p>✓ standard form / <i>standaardvorm</i></p> <p>✓ factors / <i>faktore</i></p> <p>✓ x-values / <i>waardes</i></p> <p>✓ y-values / <i>waardes</i></p> <p style="text-align: right;">(6)</p>
1.3	<p>For M to be a maximum, the denominator must be a minimum.</p> <p><i>Vir M om 'n maksimum te wees, moet die noemer 'n minimum wees.</i></p> <p><i>Min. value of denominator is at</i></p> $x = \frac{-b}{2a} = \frac{-(-4)}{2(1)} = 2$ <p><i>Min.value / waarde = $(2)^2 - 4(2) + 8 = 4$</i></p> <p><i>∴ Max.value of / Maks.waarde van :</i></p> $M = \frac{108}{4} = 27$	<p>✓ denominator to be minimum / <i>noemer moet minimum wees</i></p> <p>✓ value of x for minimum denominator / <i>waarde van x vir minimum noemer</i></p> <p>✓ minimum value / <i>minimumwaarde</i></p> <p>✓ answer / <i>antwoord</i></p> <p style="text-align: right;">(4)</p>
[25]		



QUESTION 2/VRAAG 2

2.1.1	$T_{43} = a + 42d$ $= 2 + 42(-5)$ $= -208$	<ul style="list-style-type: none"> ✓ value of d / waarde van d ✓ substitution / vervanging ✓ answer / antwoord 	(3)	
2.1.2	$S_n = \frac{n}{2}[a + l]$ $S_{43} = \frac{43}{2}[2 + (-208)]$ $= -4429$	$S_n = \frac{n}{2}[2a + (n-1)d]$ $S_{43} = \frac{43}{2}[2(2) + (43-1)(-5)]$ $= -4429$	<ul style="list-style-type: none"> ✓ substitution / vervanging ✓ answer / antwoord 	(2)
2.1.3	$T_n = -5n + 7 = -2023$ $-5n = -2030$ $n = 406$	<ul style="list-style-type: none"> ✓ general term / algemene term ✓ equating to -2030 / gelykstel aan -2030 ✓ answer / antwoord 	(3)	
2.2.1	$r = \frac{2(3x-1)^2}{2(3x-1)} = 3x-1$ <p>For convergence / Vir konvergensie: $-1 < r < 1$</p> $\therefore -1 < 3x-1 < 1$ $0 < 3x < 2$ $0 < x < \frac{2}{3}$	<ul style="list-style-type: none"> ✓ value r i.t.o x / waarde van r i.t.v x ✓ substitution / vervanging ✓ answer / antwoord 	(3)	
2.2.2	$T_1 = 2(3(\frac{1}{2})-1)^1 = 1$ $T_2 = 2(3(\frac{1}{2})-1)^2 = \frac{1}{2}$ $T_3 = 2(3(\frac{1}{2})-1)^3 = \frac{1}{4}$ $\Rightarrow r = \frac{1}{2}$ $S_\infty = \frac{a}{1-r}$ $= \frac{1}{1-\frac{1}{2}}$ $= 2$	<ul style="list-style-type: none"> ✓ first 3 terms and r / eerste 3 terme en r ✓ substitution / vervanging ✓ answer / antwoord 	(3)	



2.3	$a + ar + ar^2 = 21 \dots\dots\dots(1)$ $a \times ar \times ar^2 = 64 \dots\dots\dots(2)$ $(ar)^3 = (4)^3$ $ar = 4$ $a = \frac{4}{r} \dots\dots\dots(3)$ <p>(3) into/in (1):</p> $\frac{4}{r} + \frac{4}{r} \times r + \frac{4}{r} \times r^2 = 21$ $4r^2 - 17r + 4 = 0$ $(4r - 1)(r - 4) = 0$ $r = \frac{1}{4} \text{ or / of } r = 4$ $\Rightarrow a = 1$	<p>✓ equations 1 and 2 / <i>vergelykings 1 en 2</i></p> <p>✓ $a = \frac{4}{r}$</p> <p>✓ substitution / <i>vervanging</i></p> <p>✓ answer / <i>antwoord</i></p> <p style="text-align: right;">(4)</p>
[18]		



QUESTION 3/VRAAG 3

3.1	$\begin{array}{ccccccc} 3 & ; & 12 & ; & 33 & ; & \dots \\ & & 9 & ; & 21 & ; & \\ & & & & 12 & ; & 33 \\ & & & & & & 12 \end{array}$ $T_4 = 66$	<p>✓ answer / antwoord</p> <p>(1)</p>
3.2	$\begin{array}{ccc} 2a = 12 & 3(6) + b = 9 & 6 - 9 + c = 3 \\ a = 6 & b = -9 & c = 6 \end{array}$ $T_n = 6n^2 - 9n + 6$	<p>✓ $a = 6$</p> <p>✓ $b = -9$</p> <p>✓ $c = 6$</p> <p>(3)</p>
3.3	$\begin{array}{l} t_n = 12n - 3 = 345 \\ 12n = 348 \\ n = 29 \\ \Rightarrow T_{29} \text{ \& } T_{30} \end{array}$ <p style="text-align: center;">OR / OF</p> $\begin{array}{l} T_{n+1} - T_n = 345 \\ 6(n+1)^2 - 9(n+1) + 6 - 6n^2 + 9n - 6 = 345 \\ 6n^2 + 12n + 6 - 9n - 9 + 6 - 6n^2 + 9n - 6 - 345 = 0 \\ 12n - 348 = 0 \\ 12n = 348 \\ n = 29 \\ \Rightarrow T_{29} \text{ \& } T_{30} \end{array}$ <p style="text-align: center;">OR / OF</p> <p>by inspection: / <i>deur inspeksie</i> :</p> $\begin{array}{l} T_{30} = 6(30)^2 - 9(30) + 6 = 5136 \\ T_{29} = 6(29)^2 - 9(29) + 6 = 4791 \\ T_{30} - T_{29} = 5136 - 4791 = 345 \end{array}$	<p>✓ equating / gelykstel</p> <p>✓ value of n / waarde van n</p> <p>✓ answer / antwoord</p> <p style="text-align: center;">OR / OF</p> <p>✓ substitution / vervanging</p> <p>✓ expanding / uitbreiding</p> <p>✓ answer / antwoord</p> <p style="text-align: center;">OR / OF</p> <p>✓ $T_{30} = 5136$</p> <p>✓ $T_{29} = 4791$</p> <p>✓ $T_{30} - T_{29} = 345$</p> <p>(3)</p>
		[7]



QUESTION 4/VRAAG 4

4.1	$D(-2; -8)$	✓ answer / antwoord (1)
4.2	$x = -2$ and $y = 1$	✓ $x = -2$ and/en ✓ $y = 1$ (2)
4.3.1	$0 = a(x+2)^2 - 8$ $8 = 4a$ $2 = a$ $\Rightarrow g(x) = 2(x+2)^2 - 8$	✓ substitution / vervanging ✓ answer / antwoord (2)
4.3.2	$2(x+2)^2 - 8 = 0$ $(x+2)^2 = 4$ $x+2 = \pm 2$ $\therefore x = 0$ or / of $x = -4$ OA = 4 units / eenhede <p style="text-align: center;">OR / OF</p> Using symmetry of parabola / Gebruik van simmetrie van parabool O(0 ; 0) is 2 units away from axis of symmetry O(0 ; 0) is 2 eenhede vanaf simmetrie-as Therefore, coordinates of A(-4 ; 0) Daarom is die koördinate van A(-4 ; 0) \Rightarrow Length of OA = 4 units \Rightarrow Lengte van OA = 4 eenhede	✓ equating to 0 / stel gelyk aan 0 ✓ solving for x / los op vir x ✓ answer / antwoord <p style="text-align: center;">OR / OF</p> ✓ use of symmetry / gebruik van simmetrie ✓ coordinates of A / koördinate van A ✓ answer / antwoord (3)
4.3.3	Range of / Terrein van $f: y \neq 1; y \in \square$	✓ answer / antwoord (1)
4.3.4	$y = -x$ $\therefore y = -(x+2)+1$ $y = -x-1$	✓ method / metode ✓ answer / antwoord (2)
4.4.1	$x \in (-4 ; 0)$	✓✓ answer / antwoord (2)
4.4.2	$x \leq -4$ or / of $x \geq -2$	✓✓ answer / antwoord (2)
4.5	$-8 < k < 0$	✓ -8 ✓ 0 ✓ answer / antwoord (A) (3)
		[18]



QUESTION 5/VRAAG 5

5.1	$C(0; 1)$	✓ answer / antwoord (1)
5.2	Range of / <i>Waardeversameling van</i> $f: y \in (0; \infty)$	✓ answer / antwoord (1)
5.3	$y = 3^x$ $x = 3^y$ $\therefore y = \log_3 x$	✓ interchanging x and y / <i>omruil van x en y</i> ✓ answer / antwoord (2)
5.4	$\log_3 x < -1$ $\Rightarrow x < 3^{-1}$ $x < \frac{1}{3}$ but / <i>maar</i> $x > 0$ $\therefore 0 < x < \frac{1}{3}$	✓ $x < \frac{1}{3}$ ✓ answer / antwoord (2)
5.5	$g(x) = -x + 1$ $0 = -x + 1$ $x = 1$ $\Rightarrow P(1; 0)$ $y = 3^{-2} = \frac{1}{9}$ $\Rightarrow S(-2; \frac{1}{9})$	$-x + 1 = 3$ $-x = 2$ $x = -2$ $\Rightarrow R(-2; 3)$ ✓ coordinates of P / <i>koördinate van P</i> ✓ coordinates of Q / <i>koördinate van Q</i> ✓ coordinates of R / <i>koördinate van R</i> ✓ coordinates of S / <i>koördinate van S</i> (4)
5.6	$f(x) = 3^x$ \Rightarrow Horizontal shift of 1 unit to the left Vertical shift of 2 units down <i>Horisontale skuif van 1 eenheid na links</i> <i>Vertikale skuif van 2 eenhede af</i>	$p(x) = 3(3)^x - 2 = 3^{x+1} - 2$ ✓ horizontal shift / <i>horisontale skuif</i> ✓ vertical shift / <i>vertikale skuif</i> (2)
		[12]



QUESTION 6/VRAAG 6

6.1	$A = P(1-i)^n$ $20\,000 = 80\,000(1-i)^5$ $(1-i)^5 = 0,25$ $1-i = 0,7578582833$ $i = 0,242141\dots$ <p>\therefore Annual rate of depreciation, r Jaarlikse verminderingskoers, r</p> $= 24,21\%$	<p>✓ substitution / <i>vervanging</i></p> <p>✓ simplification / <i>vereenvoudiging</i></p> <p>✓ answer / <i>antwoord</i></p> <p>(3)</p>
6.2	$1 + i_{\text{eff}} = \left(1 + \frac{i_{\text{nom}}}{m}\right)^m$ $= \left(1 + \frac{8,5\%}{4}\right)^4$ $i_{\text{eff}} = \left(1 + \frac{8,5\%}{4}\right)^4 - 1$ $= 0,0877\dots$ <p>effective rate / <i>effektiewe koers</i> = 8,77% p.a.</p>	<p>✓ substitution / <i>vervanging</i></p> <p>✓ simplification / <i>vereenvoudiging</i></p> <p>✓ answer / <i>antwoord</i></p> <p>(3)</p>
6.3.1	$A = P(1+i)^n$ $= x \left(1 + \frac{11\%}{12}\right)^{36}$ $= 1,39x$	<p>✓ substitution / <i>vervanging</i></p> <p>✓ answer / <i>antwoord</i></p> <p>(2)</p>



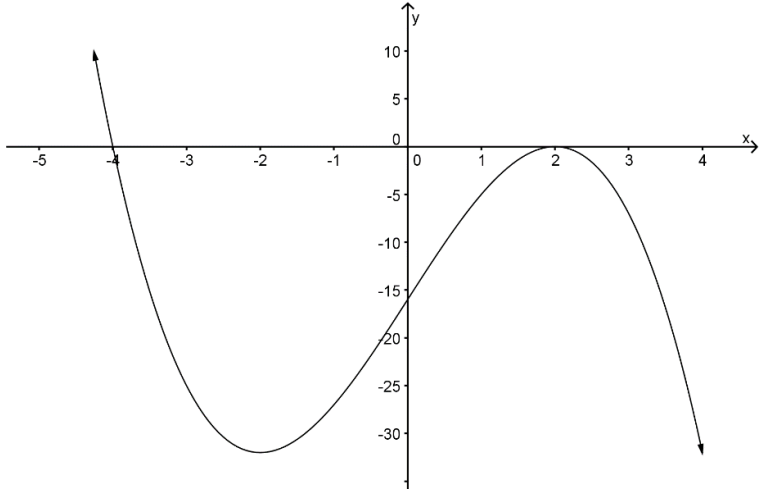
<p>6.3.2</p>	$\left[\left(x \left(1 + \frac{11\%}{12} \right)^{36} + 15\,000 \right) \left(1 + \frac{11\%}{12} \right)^{24} - 7\,000 \right] \left(1 + \frac{12\%}{2} \right)^6 = 90\,132,56$ $x = \left[\left(\frac{90\,132,56}{\left(1 + \frac{12\%}{2} \right)^6} + 7\,000 \right) \div \left(1 + \frac{11\%}{12} \right)^{24} - 15\,000 \right] \div \left(1 + \frac{11\%}{12} \right)^{36}$ $= R30\,000,00$ <p style="text-align: center;">OR / OF</p> $x \left(1 + \frac{11\%}{12} \right)^{36} + 15\,000 = 1,388878629x + 15\,000$ $(1,388878629x + 15\,000) \left(1 + \frac{11\%}{12} \right)^{24} = 1,72891573x + 18\,672,43$ $(1,72891573x + 18\,672,43 - 7\,000) \left(1 + \frac{12\%}{2} \right)^6 = 90\,132,56$ $2,4525x + 16\,557,56 = 90\,132,56$ $2,4525x = 73\,575,00$ $x = R30\,000,00$	$\checkmark \left(x \left(1 + \frac{11\%}{12} \right)^{36} + 15\,000 \right)$ $\checkmark \left(1 + \frac{11\%}{12} \right)^{24} - 7\,000$ $\checkmark \times \left(1 + \frac{12\%}{2} \right)^6 \text{ and equating}$ <p style="text-align: center;">to R90 132,56 / en gelyk stel aan R90 132,56</p> $\checkmark \text{ simplification / vereenvoudiging}$ $\checkmark \text{ answer / antwoord}$ <p style="text-align: right;">(5)</p> <p style="text-align: center;">OR / OF</p> $\checkmark x \left(1 + \frac{11\%}{12} \right)^{36} + 15\,000$ $\checkmark (1,388878629x + 15\,000) \left(1 + \frac{11\%}{12} \right)^{24}$ <p style="text-align: center;">and subtracting R7 000 en aftrekking van R7 000</p> $\checkmark \times \left(1 + \frac{12\%}{2} \right)^6 \text{ and/en}$ <p style="text-align: center;">equating to R90 132,56 / en gelyk stel aan R90 132,56</p> $\checkmark \text{ simplification / vereenvoudiging}$ $\checkmark \text{ answer / antwoord}$ <p style="text-align: right;">(5)</p>
		[13]



QUESTION 7/VRAAG 7

<p>7.1</p>	$f'(x) = \lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h}$ $= \lim_{h \rightarrow 0} \frac{\frac{1}{2}(x+h)^2 - \frac{1}{2}x^2}{h}$ $= \lim_{h \rightarrow 0} \frac{\frac{1}{2}x^2 + xh + \frac{1}{2}h^2 - \frac{1}{2}x^2}{h}$ $= \lim_{h \rightarrow 0} \frac{xh + \frac{1}{2}h^2}{h}$ $= \lim_{h \rightarrow 0} \frac{h(x + \frac{1}{2}h)}{h}$ $= \lim_{h \rightarrow 0} \left(x + \frac{1}{2}h\right)$ $= x$	<div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;"> Penalise 1 mark for incorrect notation in this question Penaliseer 1 punt vir verkeerde notasie in hierdie </div> <p>✓ $\frac{1}{2}x^2 + xh + \frac{1}{2}h^2$</p> <p>✓ simplification / vereenvoudiging</p> <div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;"> Answer ONLY: 0 marks SLEGS antwoord: 0 punte </div> <p>✓ factorisation / faktorisering (dividing by h / deel deur h)</p> <p>✓ answer / antwoord</p> <p style="text-align: right;">(4)</p>		
<p>7.2.1</p>	$f(x) = \frac{1}{5}x^5 - 6x^{-2}$ $f'(x) = x^4 + 12x^{-3}$ $= x^4 + \frac{12}{x^3}$	<p>✓ x^4</p> <p>✓ $12x^{-3}$</p> <p style="text-align: right;">(2)</p>		
<p>7.2.2</p>	<p style="text-align: center;">(ENRICHMENT / VERRYKING)</p> <p style="text-align: center;">OR / OF Chain Rule / Kettingreël</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; border-right: 1px solid black; padding: 5px;"> $\frac{d}{dx}(x + \sqrt{x})^2$ $= \frac{d}{dx}(x^2 + 2x\sqrt{x} + x)$ $= \frac{d}{dx}(x^2 + 2x^{\frac{3}{2}} + x)$ $= 2x + 3x^{\frac{1}{2}} + 1$ $= 2x + 3\sqrt{x} + 1$ </td> <td style="width: 50%; padding: 5px;"> $= 2(x + \sqrt{x})\left(1 + \frac{1}{2}x^{-\frac{1}{2}}\right)$ $= 2\left(x + \frac{1}{2}x^{\frac{1}{2}} + x^{\frac{1}{2}} + \frac{1}{2}\right)$ $= 2x + 3x^{\frac{1}{2}} + 1$ $= 2x + 3\sqrt{x} + 1$ </td> </tr> </table>	$\frac{d}{dx}(x + \sqrt{x})^2$ $= \frac{d}{dx}(x^2 + 2x\sqrt{x} + x)$ $= \frac{d}{dx}(x^2 + 2x^{\frac{3}{2}} + x)$ $= 2x + 3x^{\frac{1}{2}} + 1$ $= 2x + 3\sqrt{x} + 1$	$= 2(x + \sqrt{x})\left(1 + \frac{1}{2}x^{-\frac{1}{2}}\right)$ $= 2\left(x + \frac{1}{2}x^{\frac{1}{2}} + x^{\frac{1}{2}} + \frac{1}{2}\right)$ $= 2x + 3x^{\frac{1}{2}} + 1$ $= 2x + 3\sqrt{x} + 1$	<p>✓ $x^2 + 2x^{\frac{3}{2}} + x$</p> <p>✓✓✓ answer / antwoord</p> <p style="text-align: right;">(4)</p>
$\frac{d}{dx}(x + \sqrt{x})^2$ $= \frac{d}{dx}(x^2 + 2x\sqrt{x} + x)$ $= \frac{d}{dx}(x^2 + 2x^{\frac{3}{2}} + x)$ $= 2x + 3x^{\frac{1}{2}} + 1$ $= 2x + 3\sqrt{x} + 1$	$= 2(x + \sqrt{x})\left(1 + \frac{1}{2}x^{-\frac{1}{2}}\right)$ $= 2\left(x + \frac{1}{2}x^{\frac{1}{2}} + x^{\frac{1}{2}} + \frac{1}{2}\right)$ $= 2x + 3x^{\frac{1}{2}} + 1$ $= 2x + 3\sqrt{x} + 1$			
[10]				

QUESTION 8/VRAAG 8

8.1.1	$f(x) = -x^3 + 12x - 16$ $f(2) = -(2)^3 + 12(2) - 16$ $= -8 + 24 - 16$ $= 0$ $\therefore (x-2) \text{ is a factor / is 'n faktor}$	<ul style="list-style-type: none"> ✓ substitution / <i>vervanging</i> ✓ answer = 0 / <i>antwoord = 0</i> <p style="text-align: right;">(2)</p>
8.1.2	$f(x) = -x^3 + 0x^2 + 12x - 16$ $= (x-2)(-x^2 - 2x + 8)$ $= (x-2)(x-2)(-x-4)$ <p>Let / <i>Laat</i> $f(x) = 0$</p> $\therefore x = 2 ; x = 2 ; x = -4$	<ul style="list-style-type: none"> ✓ $(-x^2 - 2x + 8)$ ✓ $(x-2)(-x-4)$ ✓ $x = 2 ; x = 2 ; x = -4$ <p style="text-align: right;">(3)</p>
8.1.3	$f'(x) = -3x^2 + 12 = 0$ $-3x^2 = -12$ $x^2 = 4$ $x = \pm 2$ $\therefore (2;0) \text{ \& } (-2;-32)$	<ul style="list-style-type: none"> ✓ $f'(x) = 0$ ✓ simplification / <i>vereenvoudiging</i> ✓ x-values / <i>x-waardes</i> ✓ y-values / <i>y-waardes</i> <p style="text-align: right;">(4)</p>
8.1.4		<ul style="list-style-type: none"> ✓ x-intercepts / <i>x-afsnitte</i> and/en y-intercept / <i>y-afsnit</i> ✓ turning points / <i>draaipunte</i> ✓ shape / <i>vorm</i> <p style="text-align: right;">(3)</p>



8.1.5	$f(x) = -x^3 + 12x - 16$ $f'(x) = -3x^2 + 12$ $f''(x) = -6x = 0$ $x = 0$; $y = -16$ OR / OF (otherwise / andersins) Point of inflection / infleksie - /buigpunt: (0 ; -16) $m = f'(0) = -3(0)^2 + 12 = 12$ $y - (-16) = 12(x - 0)$ $y = 12x - 16$	✓ x-coordinate / x-koördinaat ✓ y-coordinate / y-koördinaat ✓ gradient of tangent gradiënt van raaklyn ✓ equation of tangent vergelyking van raaklyn (4)
8.2.1	$x \in \mathbb{R}$ (Accept / Aanvaar $x \neq 0$)	✓✓ answer / antwoord (2)
8.2.2	$x > 0$	✓✓ answer / antwoord (2)
		[20]

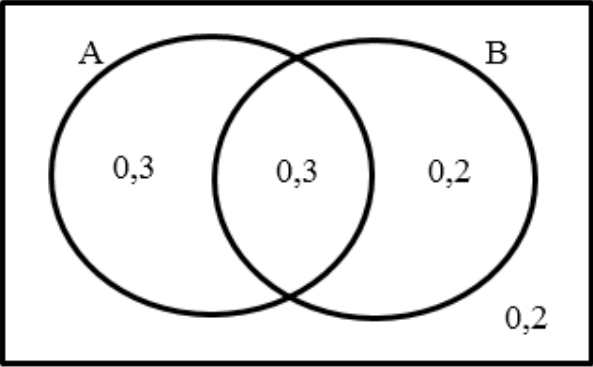


QUESTION 9/VRAAG 9

9.1	$PQ = \sqrt{x^2 + x^2}$ $= \sqrt{2}x$ $QR = \sqrt{2(200-x)^2} = \sqrt{2}(200-x)$ <i>Area / Oppervlakte</i> = $l \times b$ $= \sqrt{2}x \times \sqrt{2}(200-x)$ $= 2(200x - x^2)$	✓ $PQ = \sqrt{2}x$ ✓ $QR = \sqrt{2}(200-x)$ ✓ substitution into area formula <i>vervanging in oppervlakte formule</i> (3)
9.2	$A(x) = 400x - 2x^2$ $A'(x) = 400 - 4x = 0$ $400 = 4x$ $100 \text{ cm} = x$	✓ $A'(x)$ ✓ $A'(x) = 0$ ✓ answer / <i>antwoord</i> (3)
9.3	<i>Max area of PQRS / Maks.oppervlakte van PQRS</i> $= 400(100) - 2(100)^2$ $= 40\,000 - 20\,000$ $= 20\,000 \text{ cm}^2$ <i>Area / Oppervlakte ABCD</i> = $200 \times 200 = 40\,000 \text{ cm}^2$ <i>Ratio / Verhouding is</i> 1:2 OR / OF $\frac{1}{2}$	✓ max. area of PQRS <i>Maks. oppervlakte van PQRS</i> ✓ area of ABCD / <i>oppervlakte van ABCD</i> ✓ answer / <i>antwoord</i> (3)
		[9]



QUESTION 10/VRAAG 10

10.1.1	<p>NO / NEE</p> $P(A \text{ and/en } B) = P(A) \times P(B)$ $= 0,6 \times 0,5$ $= 0,3$ $\therefore P(A \text{ and/en } B) \neq 0$	<p>✓ No / Nee</p> <p>✓ valid reason / geldige rede</p> <p>(2)</p>
10.1.2	 <p>A Venn diagram with two overlapping circles, A and B, inside a rectangle labeled S = 1. The left part of circle A is labeled 0,3. The intersection of A and B is labeled 0,3. The right part of circle B is labeled 0,2. The area outside both circles is labeled 0,2.</p>	<p>✓ (A and / en B) = 0,3</p> <p>✓ A(only / alleen) = 0,3 and/en B(only / alleen) = 0,2</p> <p>✓ not(A or B) = 0,2 nie(A of B) = 0,2</p> <p>(3)</p>
10.1.3 (a)	$P(\text{only/slegs } A) = 0,6 - 0,3$ $= 0,3$	<p>✓ answer / antwoord</p> <p>(1)</p>
10.1.3 (b)	$P(\text{not } A \text{ or not } B) / P(\text{nie } A \text{ of nie } B)$ $= P(\text{not } A) + P(\text{not } B) - P(\text{not } A \text{ and not } B)$ $P(\text{nie } A) + P(\text{nie } B) - P(\text{nie } A \text{ en nie } B)$ $= 0,4 + 0,5 - 0,2$ $= 0,7$ <p style="text-align: center;">OR / OF</p> $P(\text{not } A \text{ or not } B) = 1 - P(A \text{ and } B)$ $P(\text{nie } A \text{ of nie } B) = 1 - P(A \text{ en } B)$ $= 1 - 0,3$ $= 0,7$	<p>✓ rule / reël</p> <p>✓ answer / antwoord</p> <p style="text-align: center;">OR / OF</p> <p>✓ rule / reël</p> <p>✓ answer / antwoord</p> <p>(2)</p>



10.2.1	$P(\text{Girl} / \text{Meisie}) = \frac{62}{100}$	✓ answer / antwoord (1)
10.2.2	$P(\text{Boy} / \text{Seun}) = \frac{38}{100} \quad \& \quad P(\text{Like camping} / \text{Hou van kamp}) = \frac{54}{100}$ $P(\text{Boy} / \text{Seun}) \times P(\text{Like camping} / \text{Hou van kamp})$ $= \frac{38}{100} \times \frac{54}{100}$ $= 0,2025$ $P(\text{Boy and Like camping}) / P(\text{Seun en Hou van kamp})$ $= \frac{24}{100}$ $= 0,24$ $\Rightarrow \text{Events are not independent} / \text{Gebeurtenisse is nie onafhanklik nie}$	✓ P(Boy) x P(like camping) P(Seun) x P(hou van kamp) ✓ answer / antwoord ✓ P(Boy and Like camping) P(Seun en hou van kamp) ✓ conclusion / gevolgtrekking (4)
10.3	Ratio / Verhouding : Green/Groen : Red/Rooi $3x : 4x$ $\text{Green+Red} / \text{Groen} + \text{Rooi} = 7x$ New Ratio / Nuwe verhouding : Green/Groen : Red/Rooi $3x+3 : 4x+2$ $\text{Green+Red} / \text{Groen} + \text{Rooi} = 7x+5$ $\Rightarrow \frac{3x+3}{7x+5} = \frac{6}{13}$ $39x+39 = 42x+30$ $9 = 3x$ $3 = x$ Green / Groen = 9 balls / balle Red / Rooi = 12 balls / balle	✓ ratio in terms of x verhouding i.t.v x ✓ new ratio in terms of x nuwe verhouding i.t.v x ✓ $\frac{3x+3}{7x+5} = \frac{6}{13}$ ✓ value of x / waarde van x ✓ answer / antwoord (5)
		[18]
		TOTAL/TOTAAL: 150

