



Province of the
EASTERN CAPE
EDUCATION

**NATIONAL
SENIOR CERTIFICATE**

GRADE 12

SEPTEMBER 2013

**MATHEMATICS P3
MEMORANDUM**

MARKS: 100

This memorandum consists of 8 pages.

QUESTION 1

1.1	34; 55	(1)	✓55
1.2	$T_1 = 1$ $T_2 = 1$ $T_3 = 2 = 1 + 1 = T_1 + T_2$ $T_4 = 3 = 1 + 2 = T_2 + T_3$ $T_5 = 5 = 2 + 3 = T_3 + T_4$ $\therefore T_5 = T_3 + T_4$ $\therefore T_n = T_{n-2} + T_{n-1}$ if $n > 2$ ($n \in \mathbf{Z}$)	(4)	$\checkmark T_5 = 5 = 2 + 3$ $\checkmark T_5 = T_3 + T_4$ $\checkmark T_n = T_{n-2} + T_{n-1}$ \checkmark restriction, $n > 2$

[5]

QUESTION 2

2.1	$A = P(1 + 0,085)^n$ $T_1 = 100(1,085)^1$ = R 108,50	(1)	✓R 108,50
2.2	$T_2 = 100(1,085)^2 = \text{R } 117,72$ $T_3 = 100(1,085)^3 = \text{R } 127,73$ $100(1,085); 100(1,085)^2; 100(1,085)^3 \dots$	(2)	✓R 117,72 ✓R 127,73
2.3	Geometric sequence, constant ratio(r) = 1,085 $r = \frac{T_2}{T_1} = \frac{100(1,085)^2}{100(1,085)} = 1,085$	(2)	✓Geometric ✓ $r = 1,085$
2.4	$T_n = ar^{n-1}$ $200 = 100(1,085)^{n-1}$ $2 = 1,085^{n-1}$ $n-1 = \log_{1,085} 2$ $= \frac{\log 2}{\log 1,085}$ OR otherwise by determining all the terms $= 8,5$ up to R200. $n = 1 + 8,5$ $= 9,5$ years	(5)	\checkmark formula \checkmark substitution \checkmark logs $\checkmark 8,5$ $\checkmark 9,5$

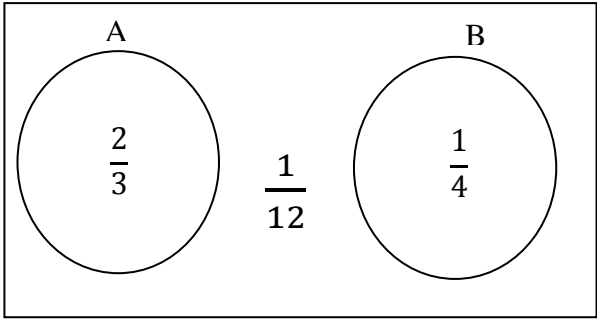
[10]

QUESTION 3

3.1	the mean (\bar{x}) = 69,8	(1)	✓ answer																				
3.2	standard deviation (σ) = 15,2	(2)	✓✓ answer																				
3.3	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Interval</th> <th>Interval range</th> <th>Observed no. of values</th> <th>Expected %</th> <th>Observed %</th> </tr> </thead> <tbody> <tr> <td>$x - \sigma$ to $x + \sigma$</td> <td>54,6 to 85,0</td> <td style="text-align: center;">34</td> <td style="text-align: center;">Approx. 68%</td> <td style="text-align: center;">68%</td> </tr> <tr> <td>$x - 2\sigma$ to $x + 2\sigma$</td> <td style="text-align: center;">39,4 to 100,2</td> <td style="text-align: center;">48</td> <td style="text-align: center;">Approx. 95%</td> <td style="text-align: center;">96%</td> </tr> <tr> <td>$x - 3\sigma$ to $x + 3\sigma$</td> <td style="text-align: center;">24,2 to 115,4</td> <td style="text-align: center;">50</td> <td style="text-align: center;">Approx. 100%</td> <td style="text-align: center;">100%</td> </tr> </tbody> </table>	Interval	Interval range	Observed no. of values	Expected %	Observed %	$x - \sigma$ to $x + \sigma$	54,6 to 85,0	34	Approx. 68%	68%	$x - 2\sigma$ to $x + 2\sigma$	39,4 to 100,2	48	Approx. 95%	96%	$x - 3\sigma$ to $x + 3\sigma$	24,2 to 115,4	50	Approx. 100%	100%	(7)	$\checkmark 39,4$ to $100,2$ $\checkmark 24,2$ to $115,4$ $\checkmark 34$ $\checkmark 50$ $\checkmark 68\%$ $\checkmark 96\%$ $\checkmark 100\%$
Interval	Interval range	Observed no. of values	Expected %	Observed %																			
$x - \sigma$ to $x + \sigma$	54,6 to 85,0	34	Approx. 68%	68%																			
$x - 2\sigma$ to $x + 2\sigma$	39,4 to 100,2	48	Approx. 95%	96%																			
$x - 3\sigma$ to $x + 3\sigma$	24,2 to 115,4	50	Approx. 100%	100%																			
3.4	Support the claim.	(1)	✓ conclusion																				

[11]

QUESTION 4

4.1	4.1.1	<p>For mutually exclusive events:</p> $P(A) + P(B) = P(A \cup B) \quad \text{or} \quad P(A \cap B) = 0$ $\frac{2}{3} + \frac{1}{4} = \frac{11}{12}$ $\frac{8+3}{12} = \frac{11}{12}$ <p>$\therefore P(A) + P(B) = P(A \cup B)$</p> <p>$\therefore$ mutually exclusive events</p>	(3)	<p>✓ probability rule</p> <p>✓ substitution</p> <p>✓ conclusion</p>																
	4.1.2		(3)	<p>✓ A only/ B only</p> <p>✓ $A \cup B$</p> <p>✓ $(A \cup B)'$</p>																
4.2	4.2.1	<table border="1" data-bbox="459 949 1118 1099"> <tr> <td></td> <td>B</td> <td>not B</td> <td>Total</td> </tr> <tr> <td>A</td> <td>30</td> <td>b=270</td> <td>d=300</td> </tr> <tr> <td>not A</td> <td>a=4</td> <td>396</td> <td>e=400</td> </tr> <tr> <td>Total</td> <td>34</td> <td>c=666</td> <td>700</td> </tr> </table>		B	not B	Total	A	30	b=270	d=300	not A	a=4	396	e=400	Total	34	c=666	700	(5)	<p>✓ a = 4</p> <p>✓ b = 270</p> <p>✓ c = 666</p> <p>✓ d = 300</p> <p>✓ e = 400</p>
	B	not B	Total																	
A	30	b=270	d=300																	
not A	a=4	396	e=400																	
Total	34	c=666	700																	
	4.2.2	<p>For independent events:</p> $P(A) \times P(B) = P(A \cap B)$ $P(A) = \frac{300}{700} = \frac{3}{7}$ $P(B) = \frac{34}{700} = \frac{17}{350}$ $P(A \cap B) = \frac{30}{700} = \frac{3}{70}$ $\therefore P(A) \times P(B) = \frac{3}{7} \times \frac{17}{350}$ $= \frac{51}{2450}$ <p>$\therefore P(A) \times P(B) \neq P(A \cap B)$</p> <p>$\therefore$ dependent events</p>	(4)	<p>✓ probability rule</p> <p>✓ substitution</p> <p>✓ $\frac{51}{2450}$</p> <p>✓ dependent</p>																

4.3	$P(A \cup B) = P(A) + P(B) - P(A \cap B)$ $P(A \cap B) = P(A) \times P(B)$ $= 0,5 \times 0,4$ $= 0,2$ $\therefore P(A \cup B) = P(A) + P(B) - P(A \cap B)$ $= 0,5 + 0,4 - 0,2$ $= 0,7$	(4)	✓probability rule ✓independent events ✓0,2 ✓0,7
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[19]

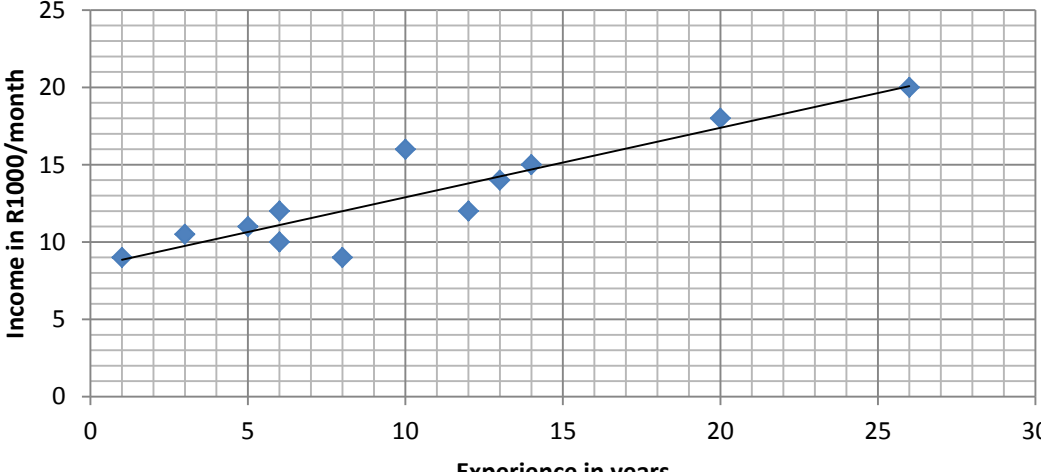
QUESTION 5

5.1	$5! = 5 \times 4 \times 3 \times 2 \times 1$ $= 120$	(2)	✓5! ✓ 120
5.2	${}^5C_3 = \frac{5!}{3!(5-3)!}$ $= \frac{5 \times 4 \times 3 \times 2 \times 1}{(3 \times 2 \times 1)(2 \times 1)}$ $= 10$ <div style="border: 1px solid black; padding: 5px; margin: 10px 0;"> <p>5.2 (Alternative)</p> <p style="text-align: center;">1 2 3 4 5 6 7 8 9 10</p> <p>Post 1: A AAAAA B BB C</p> <p>Post 2: B BB C C D C C D D</p> <p>Post 3: C D E D E E D E EE</p> </div> <p>OR otherwise by writing out the possibilities.</p>	(3)	✓ $\frac{5!}{3!(5-3)!}$ ✓ $\frac{5 \times 4 \times 3 \times 2 \times 1}{(3 \times 2 \times 1)(2 \times 1)}$ ✓10

NOTE: According to the NCS the solutions to data-handling problems should be done with the use of a calculator. The alternative is to use the pen and paper method.

[5]

QUESTION 6

6.1		(1)	✓ all points no marks for the line
6.2	$\hat{y} = a + bx$ $= 8,39 + 0,45x$	(2)	✓ a = 8,39 ✓ b = 0,45

6.3	$\bar{x} = 10,33$ $\bar{y} = 13,04$ $\hat{y} = a + bx$ $13,04 = 8,39 + 0,45(10,33)$ $= 13,0385$ $= 13,04$		$\checkmark \bar{x} = 10,33$ $\checkmark \bar{y} = 13,04$ \checkmark substitution (3)
6.4	$\hat{y} = 8,39 + 0,45(35)$ $= 24,14$ \therefore R24 140/month		\checkmark substitution \checkmark answer (2)
6.5	Yes, Experience justifies his salary OR No, he/she could be beyond his/her retirement and not an effective teacher.		\checkmark Yes/No \checkmark reason (2)
6.6	$\hat{y} = 8,39 + 0,45(12)$ $= 13,79$ \therefore R13 790 Previous employment history Qualifications relevant to the position (Any appropriate factor)		\checkmark R13 790 \checkmark Any factor (2)

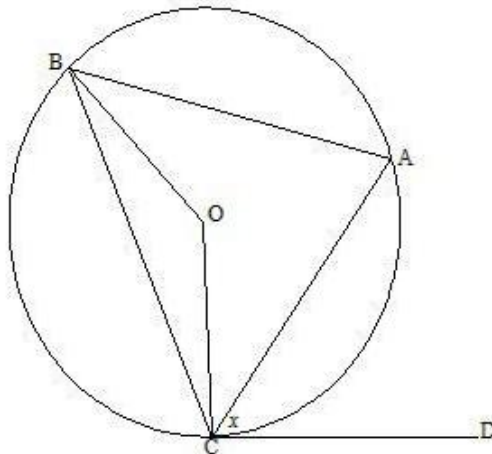
[12]

*** FOR QUESTIONS 7 TO 10 FOLLOW CANDIDATE'S REASONING ***

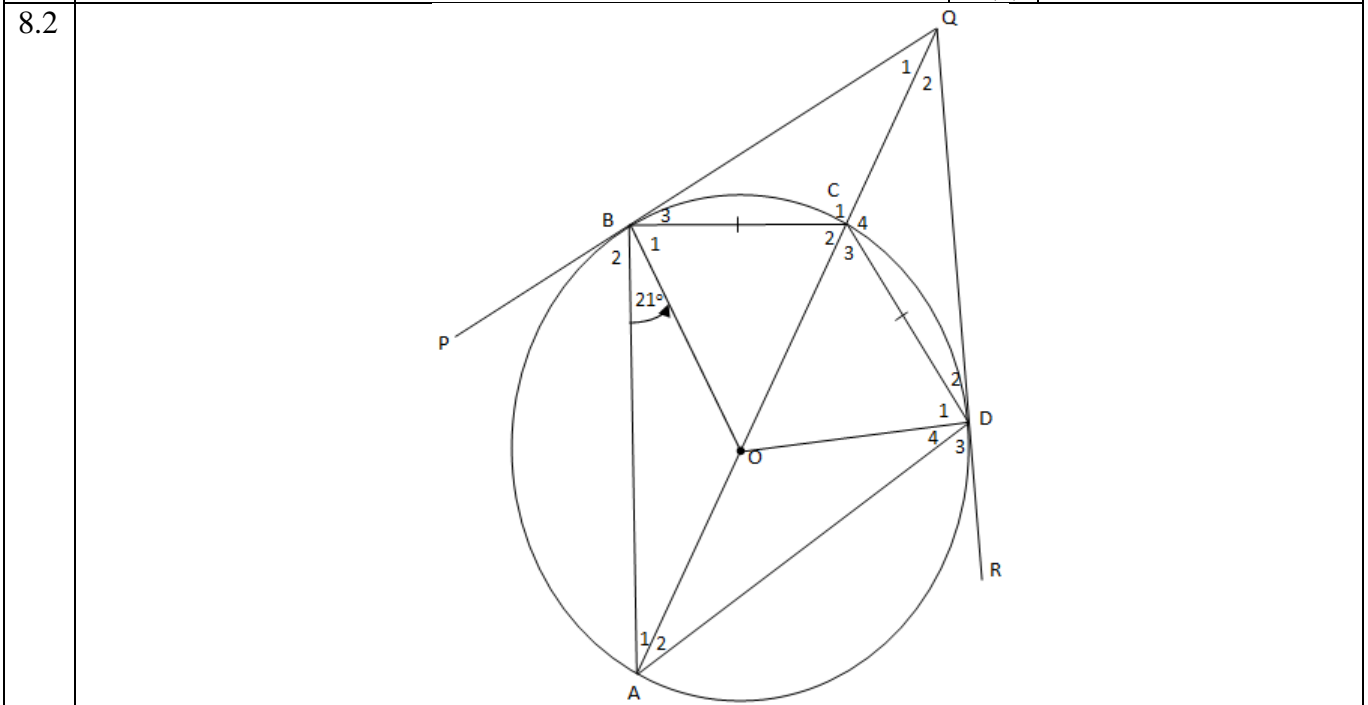
QUESTION 7

	<p>Construction: Draw diameter EH and join H and F. To prove : $\widehat{FEG} = \widehat{D}$ Proof: $\widehat{E}_1 + \widehat{E}_2 = 90^\circ$ diameter \perp tangent $\widehat{EFH} = 90^\circ$ \angle in a semi-circle $\therefore \widehat{E}_1 + \widehat{H} = 90^\circ$ \angles of $\triangle HFE = 180^\circ$ $\therefore \widehat{E}_2 = \widehat{H}$ but $\widehat{D} = \widehat{H}$ subtended by EF $\therefore \widehat{E}_2 = \widehat{D}$ both \angles = \widehat{H} $\therefore \widehat{FEG} = \widehat{D}$ OR otherwise (Many alternative proofs)</p>	\checkmark \checkmark construction \checkmark statement/ reason \checkmark statement/ reason \checkmark statement/ reason \checkmark statement/ reason \checkmark statement/ reason \checkmark statement/ reason [7] \checkmark conclusion
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QUESTION 8



8.1	<p>8.1.1 $\widehat{ACD} = \widehat{ABC} = x$ tangent/chord $\widehat{BCA} = \widehat{BAC} = x$ $AB = AC$, given $\therefore \widehat{ACD} = \widehat{BCA}$</p>	(2)	<p>✓ statement/reason ✓ statement/reason</p>
	<p>8.1.2 In $\triangle ABC$: $\hat{A} = 180^\circ - 2x$ sum of the \angle's of $\triangle = 180^\circ$ $\widehat{BOC} = 2(180^\circ - 2x)$ \angle at centre = $2 \times$ circum.\angle $= 360^\circ - 4x$ In $\triangle OBC$: $\widehat{OBC} = \widehat{OCB}$ $OB = OC$, radii $= \frac{180^\circ - (360^\circ - 4x)}{2}$ sum of the \angle's of $\triangle = 180^\circ$ $= 2x - 90^\circ$</p>	(4)	<p>✓ statement/reason ✓ statement/reason ✓ statement/reason ✓ answer</p>

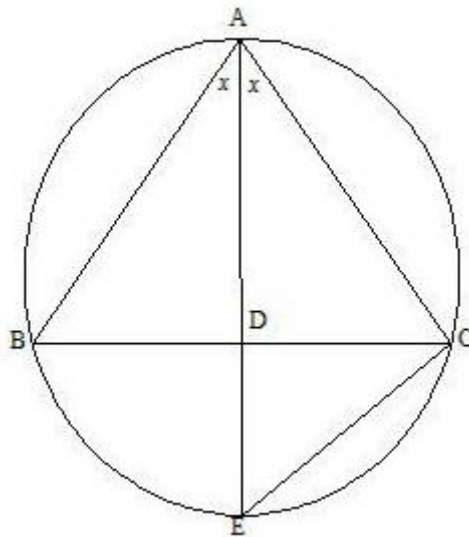


8.2	<p>8.2.1 $\hat{A}_1 = 21^\circ$ $AO = BO$, radii $\hat{A}_2 = \hat{A}_1 = 21^\circ$ $BC = CD$, given \hat{B}_3 or $\hat{D}_2 = 21^\circ$ tangent/chord $\hat{D}_4 = 21^\circ$ $OA = OD$, radii</p>	(3)	<p>✓ statement/reason ✓ statement/reason ✓ statement/reason (any three)</p>
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8.2.2	$\widehat{OBQ} = 90^\circ$ radius \perp tangent $\widehat{ODQ} = 90^\circ$ radius \perp tangent $\therefore \widehat{OBQ} + \widehat{ODQ} = 180^\circ$ Opposite angles are supplementary \Rightarrow BODQ is a cyclic quad.	(2)	✓ statement/reason ✓ conclusion
8.2.3	$\widehat{C}_4 = \widehat{A}_2 + \widehat{ADC}$ ext. \angle of $\Delta =$ sum of opp. int. \angle s $= 21^\circ + 90^\circ$ $= 111^\circ$ $\therefore \widehat{Q}_2 = 48^\circ$ sum of the \angle 's of $\Delta = 180^\circ$	(2)	✓ statement/reason ✓ answer
8.2.4	$\widehat{C}_1 = 111^\circ$ ext. \angle of $\Delta =$ sum of opp. int. \angle s $\widehat{Q}_1 = 48^\circ$ sum of the \angle 's of $\Delta = 180^\circ$ $\therefore \widehat{Q}_1 = \widehat{Q}_2 = 48^\circ$ \therefore AQ bisects $P\widehat{Q}R$	(2)	✓ statement/reason ✓ $\widehat{Q}_1 = \widehat{Q}_2 = 48^\circ$

[15]

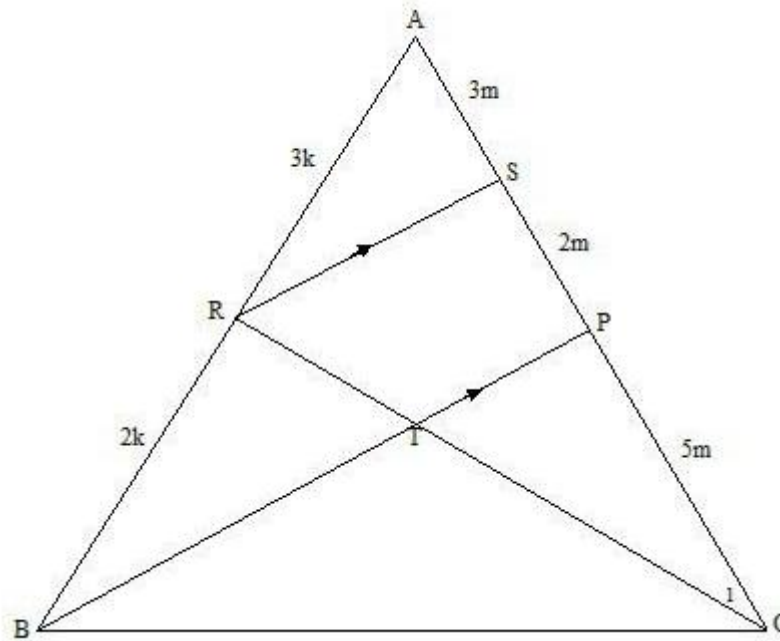
QUESTION 9



9.1	In ΔABD and ΔCED : $\widehat{BDA} = \widehat{CED}$ vert. opp. \angle 's $\widehat{ABD} = \widehat{AEC}$ circum. \angle s on AC $\therefore \Delta ABD \sim \Delta CED$ ($\angle\angle\angle$)	(3)	✓ statement/ reason ✓ statement/ reason ✓ conclusion
9.2	In ΔABD and ΔAEC : 1. $\widehat{BAD} = \widehat{CAE}$ (given – both = x) 2. $\widehat{B} = \widehat{E}$ (\angle 's on the same chord AC) $\therefore \Delta ABD \sim \Delta AEC$ ($\angle\angle\angle$) $\therefore \frac{AB}{AE} = \frac{AD}{AC}$ $\therefore AB \times AC = AD \times AE$ $= AD(AD + DE)$ $= AD^2 + AD.DE$	(4)	✓✓ proof $\checkmark \frac{AB}{AE} = \frac{AD}{AC}$ ✓ $(AD + DE)$

[7]

QUESTION 10

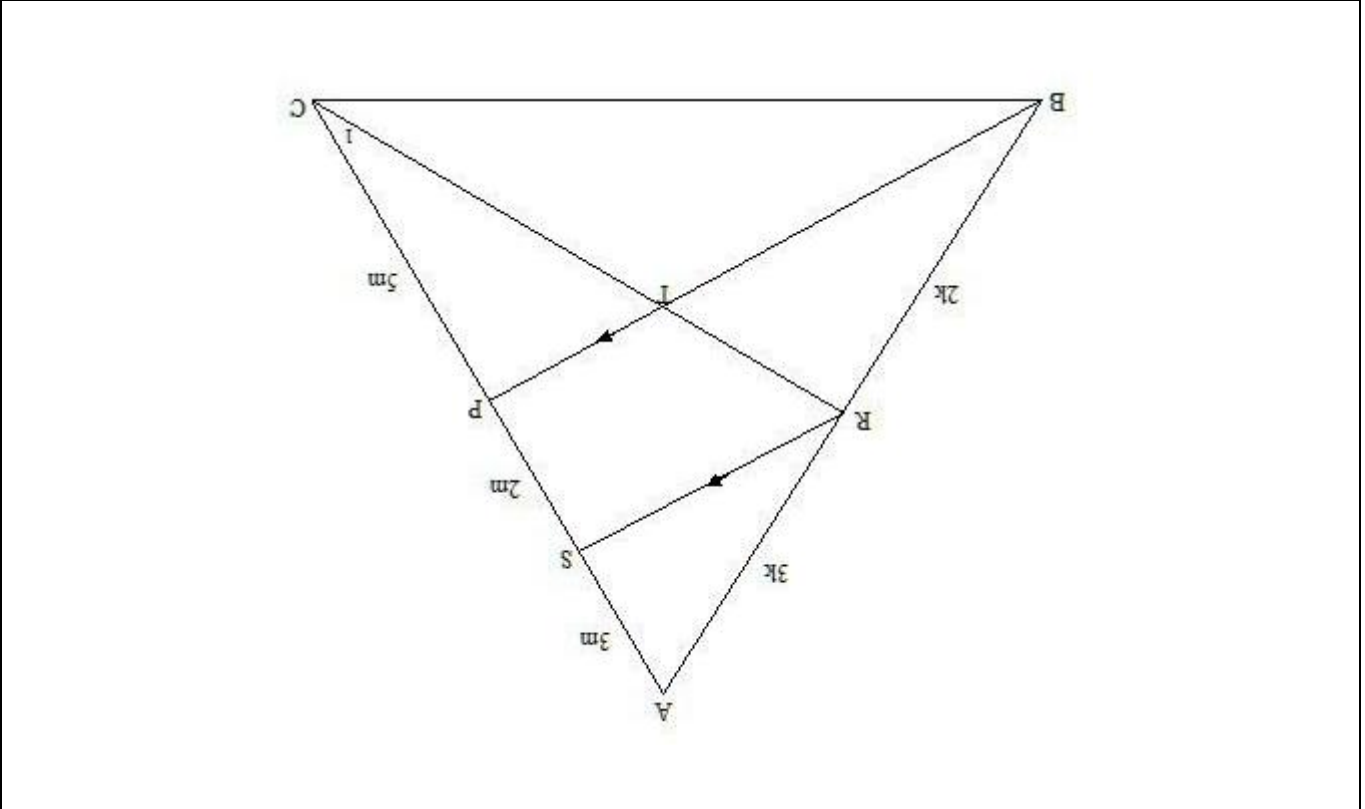


10.1	$\frac{AR}{AB} = \frac{3k}{5k}$ $\therefore \frac{AS}{SP} = \frac{3}{2}$	<p>given</p> <p>RS BP</p>	(2)	<p>✓ statement/reason</p> <p>✓ answer</p>
10.2	<p>AS = 3m and AP = 5m:</p> <p>$\therefore AP = PC = 5m$ P is the midpoint</p> $\therefore \frac{AS}{SC} = \frac{3m}{7m}$ $= \frac{3}{7}$		(2)	<p>✓</p> <p>PC = 5m</p> <p>✓ answer</p>
10.3	$\frac{RT}{TC} = \frac{2m}{5m}$ $= \frac{2}{5}$		(1)	✓ answer
10.4	$\frac{\text{Area } \Delta TPC}{\text{Area } \Delta RSC} = \frac{\frac{1}{2}TC \cdot PC \sin C_1}{\frac{1}{2}RC \cdot SC \sin C_1}$ $= \frac{TC \cdot PC}{RC \cdot SC}$ $= \frac{7 \times 7}{5 \times 5}$ $= \frac{25}{49}$		(4)	<p>✓ formula</p> <p>✓ correct ratio</p> <p>✓ substitution</p> <p>✓ answer</p>

[9]

TOTAL: 100

VRAAG 10



10.1	$\frac{AR}{3k} = \frac{AB}{5k} \text{gegeven}$ $\frac{AS}{3} = \frac{2}{3}$ $\therefore \frac{AS}{3m} = \frac{2}{5}$	(2)	✓ stelling/rede ✓ antwoord
10.2	$AS = 3m \text{ en } AP = 5m:$ $\therefore AP = PC = 5m$ P is die middelpunt	(2)	✓ PC = 5m ✓ antwoord
10.3	$\frac{RT}{2m} = \frac{TC}{5m}$ $= \frac{2}{5}$	(1)	✓ antwoord
10.4	$\frac{Oppv \Delta TPC}{\frac{1}{2} TC \cdot PC \sin C_1} = \frac{Oppv \Delta RSC}{\frac{1}{2} RC \cdot SC \sin C_1}$ $= \frac{\frac{1}{2} TC \cdot PC}{\frac{1}{2} RC \cdot SC}$ $= \frac{5 \times 5}{7 \times 7}$ $= \frac{25}{49}$	(4)	✓ formule ✓ korrekte verhouding ✓ substitusie ✓ antwoord

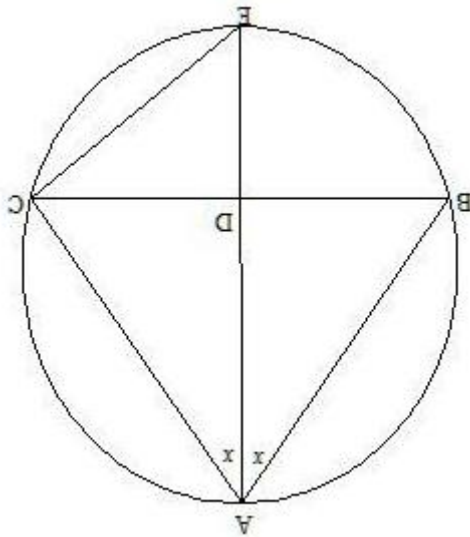
[9]

TOTAAL: 100

8.2.2	$\angle B\hat{O}D = 90^\circ$ radius Δ raaklyn $\angle O\hat{D}Q = 90^\circ$ radius Δ raaklyn $\therefore \angle O\hat{B}Q + \angle O\hat{D}Q = 180^\circ$ Teenoorstaande hoeke is supplementêre hoeke $\Rightarrow \angle BODQ$ is 'n koordevierhoek.	(2)	✓ stelling/rede
8.2.3	$\hat{C} = \hat{A}_2 + \angle ADC$ buite. \angle van $\Delta =$ som van teen. binne \angle e $= 21^\circ + 90^\circ = 111^\circ$ $\therefore \hat{Q}_2 = 48^\circ$ som van \angle 'e van $\Delta = 180^\circ$	(2)	✓ stelling/rede
8.2.4	$\hat{C}_1 = 111^\circ$ buite. \angle of $\Delta =$ som van teenbinne. \angle e $\hat{Q}_1 = 48^\circ$ som van \angle 'e van $\Delta = 180^\circ$ $\therefore \hat{Q}_1 = \hat{Q}_2 = 48^\circ$ $\therefore \triangle AQR$ halveer PQR	(2)	✓ stelling/rede

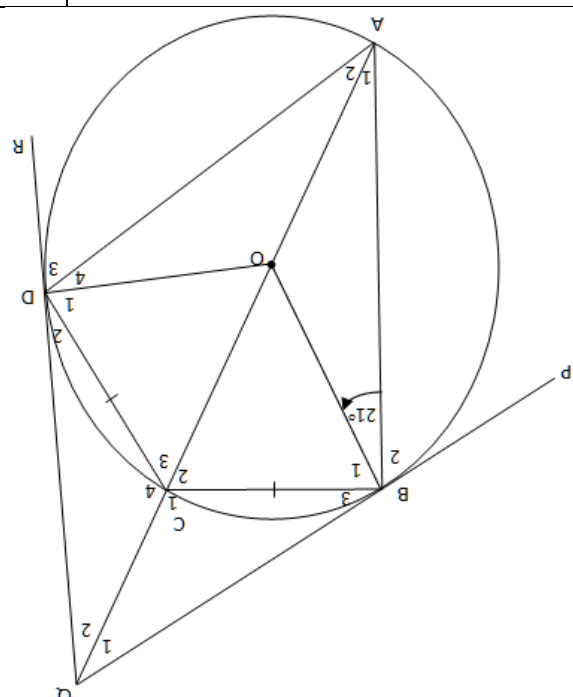
[15]

VRAAG 9



9.1	In $\triangle ABD$ en $\triangle CED$: $\angle BDA = \angle CED$ regoorstaande. \angle 'e $\angle ABD = \angle CED$ omtreks. \angle e op AC $\therefore \triangle ABD \parallel \triangle CED$ ($\angle\angle\angle$)	(3)	✓ stelling/rede ✓ stelling/rede ✓ gevolgtrekkings
9.2	In $\triangle ABD$ en $\triangle AEC$: 1. $\angle BAD = \angle CAE$ (gegees – beide = x) 2. $\hat{B} = \hat{E}$ (\angle 'e op dieselfde koord AC) $\therefore \triangle ABD \parallel \triangle AEC$ ($\angle\angle\angle$) $\therefore \frac{AB}{AD} = \frac{AE}{AC}$ $\therefore AB \times AC = AD \times AE$ $= AD(AD + DE)$ $= AD^2 + AD \cdot DE$	(4)	✓ bewys $\frac{AB}{AD} = \frac{AE}{AC}$ $\checkmark (AD + DE)$

[7]

		<p>8.1.1 $\widehat{ACD} = \widehat{ABC} = x$ raaklyn/koord $\widehat{BCA} = \widehat{AB}C = x$ $AB = AC$, gegee $\therefore \widehat{ACD} = \widehat{BCA}$</p>	<p>8.1</p>	
<p>✓ stelling/rede</p>	(2)	<p>8.1.2 In $\triangle ABC$: $\widehat{A} = 180^\circ - 2x$ som van die \angle'e of $\Delta = 180^\circ$ $\widehat{BDC} = 2(180^\circ - 2x)$ \angle by midpt = $2 \times$ omtreks.\angle $= 360^\circ - 4x$ In $\triangle OBC$: $OB = OC$, radiusse $\widehat{OBC} = \widehat{OCB} = \frac{180^\circ - (360^\circ - 4x)}{2}$ $= 2x - 90^\circ$ som van die \angle'e van $\Delta = 180^\circ$</p>	<p>8.2</p>	
<p>✓ stelling/rede ✓ stelling/rede ✓ stelling/rede antwoord</p>	(4)	<p>8.2</p>	<p>8.2</p>	
<p>✓ stelling/rede ✓ stelling/rede ✓ stelling/rede (enige drie)</p>	(3)	<p>8.2.1 $\widehat{A_1} = 21^\circ$ $\widehat{A_2} = \widehat{A_1} = 21^\circ$ $\widehat{B_3}$ of $\widehat{D_2} = 21^\circ$ $\widehat{D_4} = 21^\circ$ $AO = BO$, radiusse $BC = CD$, gegee raaklyn/koord $OA = OD$, radiusse</p>	<p>8.2</p>	

6.3	$x = 10,33$ $\bar{y} = 13,04$ $\hat{y} = a + bx$ $13,04 = 8,39 + 0,45(10,33)$ $= 13,0385$ $= 13,04$	(3)	✓ substitusie
6.4	$\hat{y} = 8,39 + 0,45(35)$ $= 24,14$: R24 140/maand	(2)	✓ substitusie ✓ antwoord
6.5	Ja, Ondervindig regverdig sy salaris OF Nee, hy/sy kan verby sy/haar aftrede wees en n oneffektiewe onderwyser wees.	(2)	✓ Ja/Nee ✓ rede
6.6	$\hat{y} = 8,39 + 0,45(12)$ $= 13,79$: R13 790 Vorige werkskeskiedenis Kwalifikasies toepaslik vir die posisie (Enige toepaslike faktor)	(2)	✓ R13 790 ✓ Enige faktor

[12]

*** VIR VRAAG 7 TOT 10 VOLG
KANDIDATE SE REDENASIE ***

VRAAG 7

<p>Konstruksie: Teken middellyn EH en verbind H en F. Te bewys: $F\hat{E}G = \hat{D}$ Bewys: $\hat{E}_1 + \hat{E}_2 = 90^\circ$ middellyn \perp raaklyn $E\hat{F}H = 90^\circ$ \angle in n semi-sirkel $\therefore \hat{E}_1 + \hat{H} = 90^\circ$ \angle of $\Delta HFE = 180^\circ$ $\therefore \hat{E}_2 = \hat{H}$ maar $\hat{D} = \hat{H}$ onderspan deur EF $\therefore \hat{E}_2 = \hat{D}$ beide $\angle = \hat{H}$ $\therefore F\hat{E}G = \hat{D}$ Of andersins (Baie alternatiewe bewyse)</p>	
<p>✓ konstruksie ✓ stelling/rede ✓ stelling/rede ✓ stelling/rede ✓ stelling/rede ✓ stelling/rede ✓ gevolg- trekking</p>	<p>[7]</p>

4.3	$P(A \cup B) = P(A) + P(B) - P(A \cap B)$ $P(A \cap B) = P(A) \times P(B)$ $= 0,5 \times 0,4$ $= 0,2$ $\therefore P(A \cup B) = P(A) + P(B) - P(A \cap B)$ $= 0,5 + 0,4 - 0,2$ $= 0,7$	(4)	✓ waarskynlikheidsreël ✓ onafhanklike gebeurtenisse ✓ 0,2 ✓ 0,7
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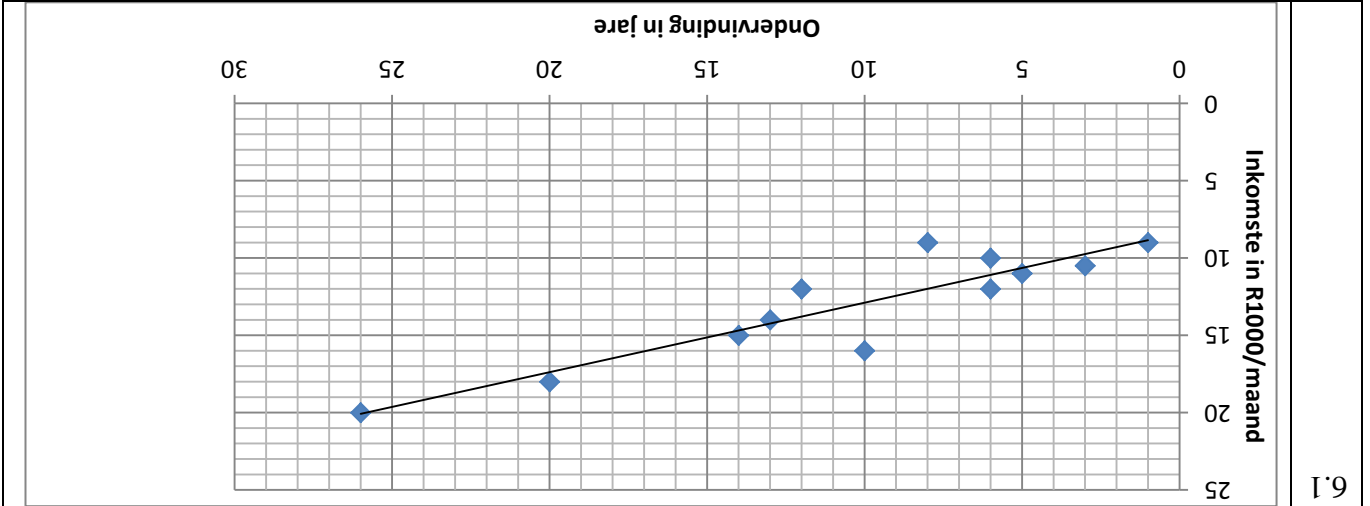
[19]

VRAAG 5

5.1	$5! = 5 \times 4 \times 3 \times 2 \times 1$ $= 120$	(2)	✓ 5! ✓ 120
5.2	${}^5C_3 = \frac{5!}{3!(5-3)!}$ <p>OF andersins deur moontlikhede neer te skryf.</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;"> <p>5.2 (Alternatief)</p> <p>Pos 1: A A A A A B B B C 1 2 3 4 5 6 7 8 9 10</p> <p>Pos 2: B B B C C C D D D 1 2 3 4 5 6 7 8 9 10</p> <p>Pos 3: C D E D E D E E E</p> </div> $= \frac{5 \times 4 \times 3 \times 2 \times 1}{(3 \times 2 \times 1)(2 \times 1)}$ $= 10$	(3)	✓ $\frac{3!(5-3)!}{5!}$ ✓ $\frac{5 \times 4 \times 3 \times 2 \times 1}{(3 \times 2 \times 1)(2 \times 1)}$ ✓ 10

NEM KENNIS: Volgens die NCS moet die oplossing vir Datahantering probleme op 'n sakrekenaar gedoen word. Die alternatief is die gebruik van die pen en papier metode.

[5]



6.1

VRAAG 6

6.2	$\hat{y} = a + bx$ $= 8,39 + 0,45x$	(2)	✓ $a = 8,39$ ✓ $b = 0,45$
		(1)	✓ alle punte ✓ vir die lyn

VRAAG 1

34; 55	(1)	✓55
1.2	(4)	$T_1 = 1$ $T_2 = 1$ $T_3 = 2 = 1 + 1 = T_1 + T_2$ $T_4 = 3 = 1 + 2 = T_2 + T_3$ $T_5 = 5 = 2 + 3 = T_3 + T_4$ $T_5 = 5 = 2 + 3 = T_3 + T_4$ $T_5 = T_3 + T_4$ $T_n = T_{n-2} + T_{n-1}$ as $n > 2$ ($n \in \mathbb{Z}$) $T_n = T_{n-2} + T_{n-1}$ as $n > 2$ ($n \in \mathbb{Z}$)

VRAAG 2

2.1	(1)	$A = P(1 + 0,085)^n$ $T_1 = 100(1,085)^1$ $T_1 = R 108,50$
2.2	(2)	$T_2 = 100(1,085)^2 = R 117,72$ $T_3 = 100(1,085)^3 = R 127,73$ $100(1,085)^1; 100(1,085)^2; 100(1,085)^3; \dots$
2.3	(2)	Meetkundige ry, konstante verhouding ($r = 1,085$) $r = \frac{T_2}{T_1} = \frac{100(1,085)^2}{100(1,085)^1} = 1,085$
2.4	(5)	$T_n = ar^{n-1}$ $200 = 100(1,085)^{n-1}$ $2 = 1,085^{n-1}$ $n-1 = \frac{\log 2}{\log 1,085}$ $n = 1 + 8,5$ $n = 9,5$ jare OF andersins die berekening van alle terme tot by R200.

[10]

VRAAG 3

3.1	(1)	✓ antwoord	die gemiddelde (\bar{x}) = 69,8																				
3.2	(2)	✓ antwoord	standaard afwyking (σ) = 15,2																				
3.3	(7)	✓39,4 tot 100,2 ✓24,2 tot 115,4 ✓34 ✓50 ✓68% ✓96% ✓100%	<table border="1"> <thead> <tr> <th>Interval</th> <th>Intervalwyde</th> <th>Waargenome nr. van waardes</th> <th>Verwagte %</th> <th>Waargenome %</th> </tr> </thead> <tbody> <tr> <td>$x - \sigma$ tot $x + \sigma$</td> <td>54,6 tot 85,0</td> <td>34</td> <td>Naast. 68%</td> <td>68%</td> </tr> <tr> <td>$x - 2\sigma$ tot $x + 2\sigma$</td> <td>39,4 tot 100,2</td> <td>48</td> <td>Naast. 95%</td> <td>96%</td> </tr> <tr> <td>$x - 3\sigma$ tot $x + 3\sigma$</td> <td>24,2 tot 115,4</td> <td>50</td> <td>Naast. 100%</td> <td>100%</td> </tr> </tbody> </table>	Interval	Intervalwyde	Waargenome nr. van waardes	Verwagte %	Waargenome %	$x - \sigma$ tot $x + \sigma$	54,6 tot 85,0	34	Naast. 68%	68%	$x - 2\sigma$ tot $x + 2\sigma$	39,4 tot 100,2	48	Naast. 95%	96%	$x - 3\sigma$ tot $x + 3\sigma$	24,2 tot 115,4	50	Naast. 100%	100%
Interval	Intervalwyde	Waargenome nr. van waardes	Verwagte %	Waargenome %																			
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$x - 3\sigma$ tot $x + 3\sigma$	24,2 tot 115,4	50	Naast. 100%	100%																			
3.4	(1)	✓ gevolg-trekking	Ondersteun die bewering.																				

[11]

Hierdie memorandum bestaan uit 8 bladsye.

PUNTE: 100

**WISKUNDE V3
MEMORANDUM**

SEPTEMBER 2013

GRAAD 12

**NASIONALE
SENIOR SERTIFIKAT**

Province of the
EASTERN CAPE
EDUCATION

