Province of the
EASTERN CAPE
EDUCATION

NATIONAL SENIOR CERTIFICATE

GRADE/ *GRAAD* 11

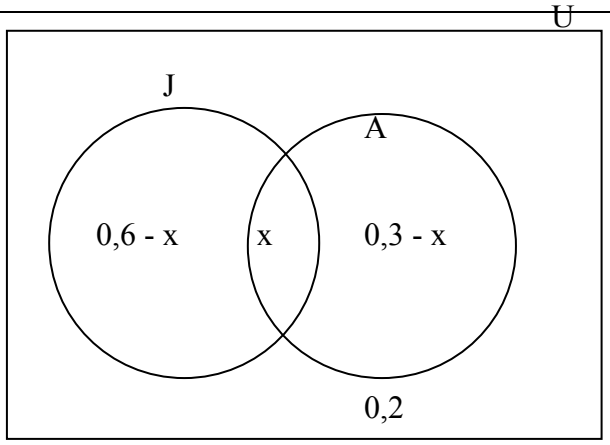
NOVEMBER 2011

MATHEMATICS P3/ *WISKUNDE V3* MEMORANDUM

MARKS: **100**
PUNTE:

This memorandum consists of 10 pages./
Hierdie memorandum bestaan uit 10 bladsye.

QUESTION/ *VRAAG* 1

1.1	P(A and/*en* B) = P(A) × P(B) 0,2 = 0,8 × P(B) 0,25 = P(B)		√ probability rule/ *waarskynlikheidsreël* √ answer/ *antwoord*	(2)
1.2	1.2.1	P(A and/ *en* B) = 0	√ 0	(1)
	1.2.2	P(A or/ *of* B) = P(A) + P(B)	√ P(A) + P(B)	(1)
1.3	1.3.1		√ 0,6 - *x* √ *x* √ 0,3 - *x* √ 0,2	(4)
	1.3.2	Let *x* be in/ *Stel x in* J ∩ A 0,6- x + x + 0,3 – x + 0,2 = 1 -x = -0,1 x = 0,1 ∴ P(J and/ *en* A) = 0,1	√ J ∩ A √ equation/ *vergelyking* √ answer/ *antwoord*	(3)
	1.3.3	P(J or/ *of* A) = P(R) + P(S) = 0,6 – 0,1 + 0,3 – 0,1 = 0,7	√ probability rule √ answer/ *antwoord*	(2)
	1.3.4	P(J') = 1 – P(J) = 1 – (0,6) = 0,4	√ probability rule √ answer/ *antwoord*	(2)
				[15]

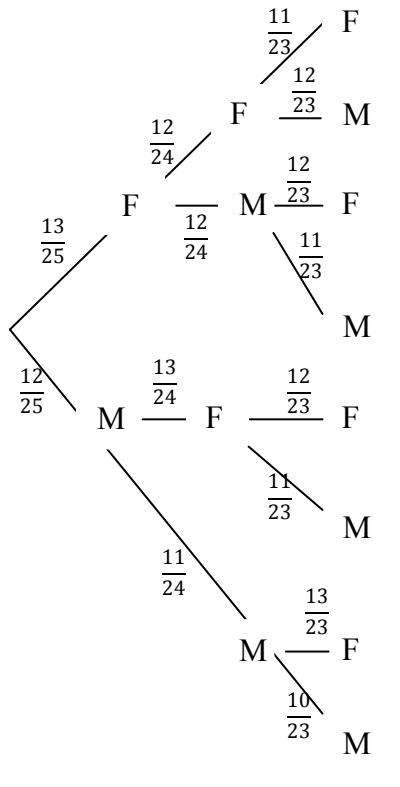
QUESTION/ *VRAAG* 2

<table>
<tr><td>2.1</td><td>a = 30 ; b = 396 ; c = 400 and/ en d = 700</td><td>√√√√
One mark per answer/
Een punt per antwoord</td><td>(4)</td></tr>
<tr><td></td><td></td><td></td><td></td></tr>
<tr><td>2.2</td><td>
<table>
<tr><td></td><td>Girls (G)</td><td>Boys (B)</td><td>Total</td></tr>
<tr><td>nuclear energy/ kernkrag (N)</td><td>30</td><td>270</td><td>300</td></tr>
<tr><td>Not nuclear energy/ Nie kernkrag (not/ nie N)</td><td>4</td><td>396</td><td>400</td></tr>
<tr><td>Total/ Totaal</td><td>34</td><td>666</td><td>700</td></tr>
</table>
$P(N) = \frac{300}{700} = \frac{3}{7}$
$P(G) = \frac{34}{700} = \frac{17}{350}$
$P(N \text{ and/ } en \text{ } G) = \frac{30}{700} = \frac{3}{70} = 0{,}043$
$P(N) \times P(G) = \frac{3}{7} \times \frac{17}{350}$
$= \frac{51}{2450} = 0{,}021$
$P(N \text{ and/ } en \text{ } G) \neq P(N) \times P(G)$
∴ not independent/ nie onafhanklik nie
</td><td>√ P(N)
√ P(G)
√ P(N and/ en G)
√ Product/ produk
√ deduction/ afleiding
√ conclusion/ gevolgtrekking</td><td>(6)</td></tr>
<tr><td></td><td></td><td></td><td></td></tr>
<tr><td>2.3</td><td>$\frac{400}{700} \times \frac{35000}{1}$ = 20 000 learners/ leerlinge</td><td>√ calculation/ berekening
√ answer/ antwoord</td><td>(2)</td></tr>
<tr><td></td><td></td><td></td><td></td></tr>
<tr><td>2.4</td><td>No. The sample size is very small, only 0,02 % of a very large learner population.
Nee. Die steekproef is te klein, slegs 0,02 % van 'n baie groot leerlingbevolking.

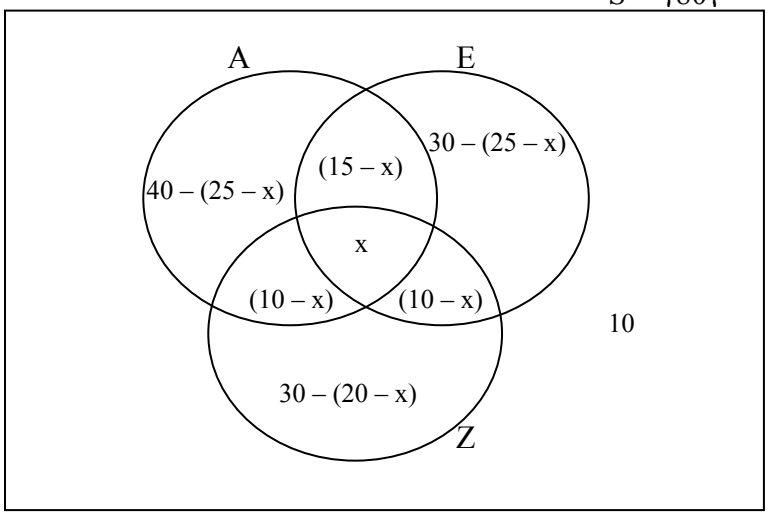
Yes. The sample was chosen at random which should be a good representation of the learner population.
Ja. Die steekproef was ewekansig gekies, wat 'n goeie verteenwoordiging van die leerlingbevolking kan wees</td><td>√ No / Yes/ Nee / Ja

√ valid explanation/ geldige verduideliking</td><td>(2)</td></tr>
<tr><td></td><td></td><td></td><td>[14]</td></tr>
</table>

QUESTION/ *VRAAG* 3

3.1	 FFF $= \frac{143}{1150}$ FFM $= \frac{78}{575}$ FMF $= \frac{78}{575}$ FMM $= \frac{143}{1150}$ MFF $= \frac{78}{575}$ MFM $= \frac{143}{1150}$ MMF $= \frac{143}{1150}$ MMM $= \frac{11}{115}$	F = *V (in Afr)* √1st outcomes/ *1ste uitkomste* √√ 2nd outcomes/ *2de uitkomste* √√√ 3rd outcomes/ *3de uitkomste* √ answer/ *antwoord*	(5)
3.2	P(All 3 males/ *Al 3 manne*) $= \frac{11}{115}$		(1)
3.3	P(All 3 females/ *Al 3 vroue*) $= \frac{143}{1150}$	√ reason/ *rede*	(1)
3.4	P(2 males and 1 female/ *2 manne en 1 vrou*) $= \frac{143}{1150} + \frac{143}{1150} + \frac{143}{1150} = \frac{429}{1150}$	√ addition/ *optelling* √ answer/ *antwoord*	(2)
3.5	P(2 females and 1 male/ *2 vroue en 1 man*) $= \frac{78}{575} + \frac{78}{575} + \frac{78}{575} = \frac{234}{575}$	√ addition √ answer/ *antwoord*	(2)
3.6	P(MMF) $= \frac{143}{1150}$	√ answer/ *antwoord*	(1)
			[12]

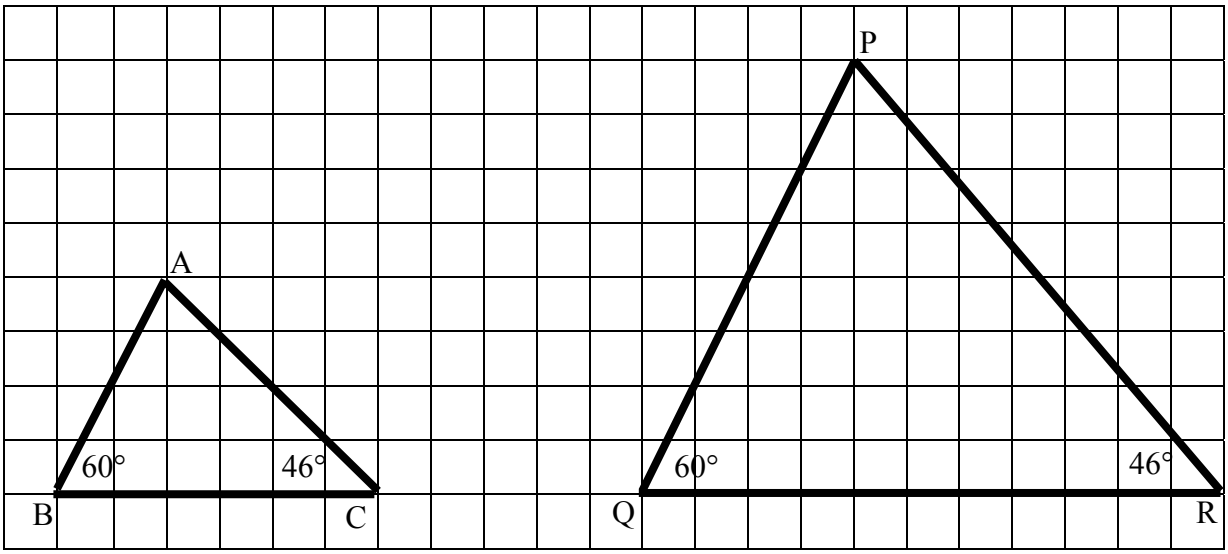
QUESTION/ *VRAAG* 4

4.1	S = {80}  	√ 40 – (25 – x) √ 30 – (25 – x) √ 30 – (20 – x) √ 15 - x √ 10 – x	(5)
4.2	15 + x + 15 – x + 5 + x + x + 10 – x + 10 – x +10 + x + 10 = 80 x = 5 **OR/ *OF*** 40 - 25+ x + 15- x+ 30 – 25 + x + x + 10 – x + 10 – x + 30 - 20 + x + 10 = 80 x = 5	√ addition/ *optelling* √ 80 √ answer/ *antwoord*	(3)
4.3	P(A and/ *en* E not/ *nie* Z) = $\frac{10}{80} = \frac{1}{8}$	√ 10 √ answer/ *antwoord*	(2)
			[10]

QUESTION/ *VRAAG* 5

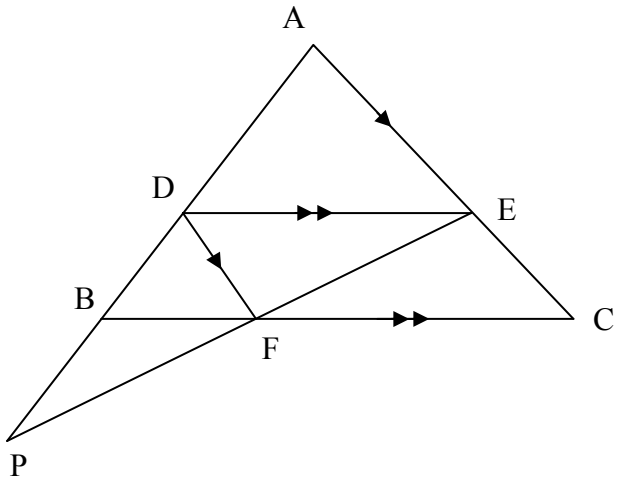
5.1	GRAPH B. The scale on the vertical axis is causing the effect. *GRAFIEK B. Die skaal op die vertikale as veroorsaak die effek.*	√ GRAPH/ *GRAFIEK* B √ reason/ *rede*	(2)
5.2	GRAPH B. The scale on the vertical axis is causing the effect. *GRAFIEK B. Die skaal op die vertikale as veroorsaak die effek.*	√ GRAPH/ *GRAFIEK* B √ reason/ *rede*	(2)
5.3	No, the petrol price is dependent on world oil prices which are very volatile and also depends on the political situation in oil producing countries. *Nee, die petrolprys is afhanklik van wêreld-oliepryse wat baie wisselvallig is en is ook afhanklik van die politieke situasie in olie vervaardigende lande*	√ No/ *Nee* √ reason/ *rede*	(2)
			[6]

QUESTION/ *VRAAG* 6



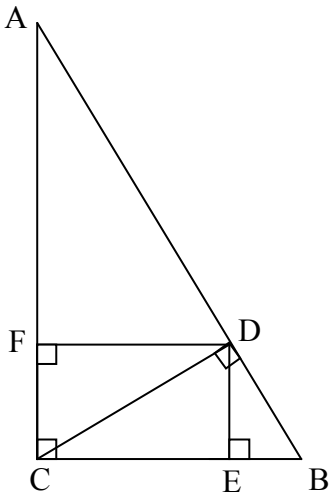
6.1	Yes. The triangles are equi-angular./ *Ja. Die driehoeke is gelykhoekig.*	√ Yes/ *Ja* √ reason/ *rede*	(2)
6.2	Area ΔPQR = $(2)^2 \times 12$ = 48 units^2/ *eenhede*^{2}	√ $(2)^2$ √ answer/ *antwoord*	(2)
			[4]

QUESTION/ *VRAAG* 7



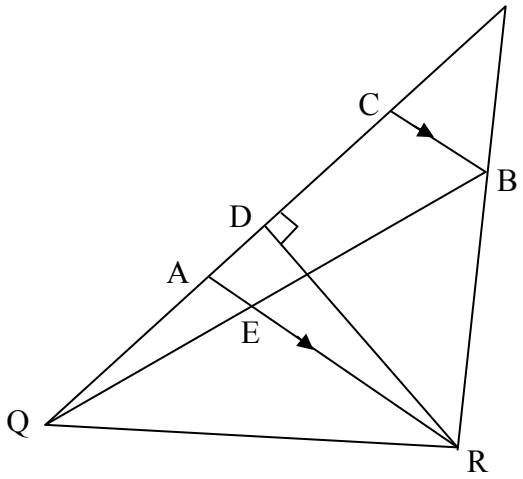
7.1	7.1.1	$\frac{AD}{DB} = \frac{AE}{EC}$ DE ‖ BC of/ *van* ΔABC	√ statement/ *stelling* √ reason/ *rede*	(2)
	7.1.2	$\frac{BF}{FC} = \frac{BD}{DA}$ DF ‖ AC of/ *van* ΔABC	√ statement/ *stelling* √ reason/ *rede*	(2)
	7.1.3	$\frac{AE}{EC} \times \frac{BF}{FC} = \frac{AD}{DB} \times \frac{BD}{DA} = 1$	√ $\frac{AD}{DB} \times \frac{BD}{DA}$ √ 1	(2)
	7.1.4	In ΔBDF and/ *en* ΔDAE: $B\hat{D}F = D\hat{A}E$ … corresponding angles/ *ooreenkomstige hoeke*, DF‖ AE $D\hat{B}F = A\hat{D}E$ … corresponding angles/ *ooreenkomstige hoeke*, BF‖ DE ∴ ΔBDF /// ΔDAE (AAA)	√ angles/ *hoeke* √ angles/ *hoeke* √ conclusion/ *gevolgtrekking*	(3)
	7.1.5	(a) $\frac{BF}{DE} = \frac{DF}{AE}$ … similar triangles/ *gelykvormige driehoeke* ∴ AE = $\frac{DE \times DF}{BF}$ = $\frac{9 \times 2,1}{3}$ = 6,3 units/ *eenhede*	√ $\frac{BF}{DE} = \frac{DF}{AE}$ √ AE = $\frac{DE \times DF}{BF}$ √substitution/ *substitusie* √ answer/ *antwoord*	(4)
		(b) DF = EC….. opposite sides of a parallelogram/ *teenoorstaande sye van 'n parallelogram* ∴ EC = 2,1 units/ *eenhede* ∴ AC = AE + EC = 6,3 + 2,1 = 8,4 units/ *eenhede*	√ DF = EC √ answer/ *antwoord*	(2)
				[15]

QUESTION/ *VRAAG* 8



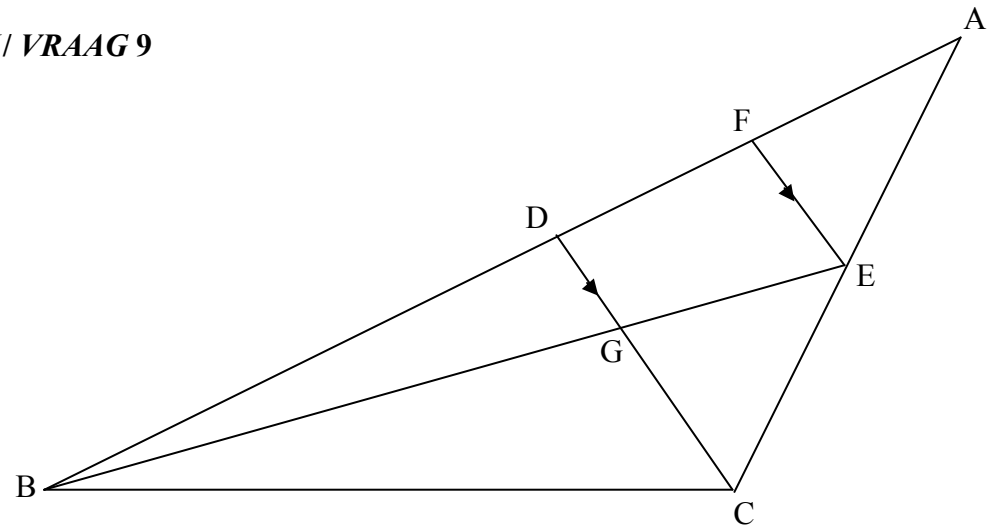
8.1	8.1.1	ΔACB; ΔADC,; ΔCED,; ΔDEB,; ΔCDB; ΔDFC	√√√ any three triangles/ *enige drie driehoeke*	(3)
	8.1.2	ΔACB/// ΔADC $\therefore \frac{BC}{AC} = \frac{CD}{AD}$ Δ ACB/// ΔCDB $\therefore \frac{BC}{AC} = \frac{BD}{CD}$ $\therefore \frac{BC}{AC} \times \frac{BC}{AC} = \frac{CD}{AD} \times \frac{BD}{CD}$ $\frac{BC^2}{AC^2} = \frac{BD}{AD}$	√ $\frac{BC}{AC} = \frac{CD}{AD}$ √ $\frac{BC}{AC} = \frac{BD}{CD}$ √ $\frac{BC}{AC} \times \frac{BC}{AC}$ √ $\frac{CD}{AD} \times \frac{BD}{CD}$	(4)
	8.1.3	Δ ADC/// ΔDEB $\therefore \frac{DC}{AC} = \frac{EB}{DB}$ ∴ EB × AC = DC × DB Δ AFD/// ΔCDB $\therefore \frac{AF}{AD} = \frac{CD}{CB}$ ∴ AF × CB = AD × CD $\therefore \frac{EB \times AC}{AF \times CB} = \frac{DC \times DB}{AD \times CD}$ $= \frac{DB}{AD}$ $= \frac{BC^2}{AC^2}$ … from/ *vanaf* 8.1.2 $\frac{EB \times AC}{AF \times CB} = \frac{BC^2}{AC^2}$ $\frac{EB}{AF} = \frac{BC^2}{AC^2} \text{x} \frac{BC}{AC}$ $= \frac{BC^3}{AC^3}$	√ $\frac{DC}{AC} = \frac{EB}{DB}$ √ $\frac{AF}{AD} = \frac{CD}{CB}$ √ $\frac{EB}{AF} \times \frac{AC}{CB} = \frac{BC^2}{AC^2}$ √$\frac{BC^2}{AC^2} \text{x} \frac{BC}{AC}$	(4)

8.2



	8.2.1	Δ PRA and/ *en* ΔQRA have the same height/ *het dieselfde hoogte (h)* PA = $\frac{3}{8}$ PQ and AQ = $\frac{5}{8}$ so that/ *sodat* $\frac{PA}{AQ}=\frac{3}{5}$ $\therefore \frac{area\ \Delta PRA}{area \Delta QRA}=\frac{\frac{1}{2}PA\times h}{\frac{1}{2}QA\times h}$ $=\frac{PA}{QA}$ $=\frac{3}{5}$	√ $\frac{PA}{AQ}=\frac{3}{5}$ √ ratio/ *verhouding* √ answer/ *antwoord*	(3)
	8.2.2	In ΔQBC, EA∥ BC (given/ *gegee*) $\therefore \frac{BE}{EQ}=\frac{CA}{AQ}$ In ΔPAR: $\frac{PC}{CA}=\frac{PB}{BR}$ (RA∥ BC) $\frac{PC}{CA}=\frac{1}{2}$ In ΔPQR: $\frac{PA}{AQ}=\frac{3}{5}$ (given/ *gegee*) ∴ PC : CA :AQ = 1 : 2 : 5 $\therefore \frac{CA}{AQ}=\frac{2}{5}$ $\therefore \frac{BE}{EQ}=\frac{2}{5}$ … ($\frac{BE}{EQ}=\frac{CA}{AQ}$)	√ $\frac{BE}{EQ}=\frac{CA}{AQ}$ √ $\frac{PC}{CA}=\frac{1}{2}$ √ $\frac{CA}{AQ}=\frac{2}{5}$ √ $\frac{BE}{EQ}=\frac{2}{5}$	(4)
				[18]

QUESTION/ *VRAAG* 9



9.1	$\frac{AF}{FD}=\frac{3}{2}$	√ answer/ *antwoord*	(1)
9.2	$\frac{AF}{FB}=\frac{3}{7}$	√ answer/ *antwoord*	(1)
9.3	$\frac{EG}{GB}=\frac{2}{5}$	√ answer/ *antwoord*	(1)
9.4	$\frac{\Delta AFE}{\Delta ADE}=\frac{3}{5}$ … (1) $\frac{\Delta ADC}{\Delta ADE}=\frac{5}{3}$ … (2) (1) ÷ (2) $\frac{\Delta AFE}{\Delta ADC}=\frac{3}{5}\times\frac{3}{5}$ $=\frac{9}{25}$	√ $\frac{\Delta AFE}{\Delta ADE}=\frac{3}{5}$ √ $\frac{\Delta ADC}{\Delta ADE}=\frac{5}{3}$ √ answer/ *antwoord*	(3)

[6]

TOTAL/ *TOTAAL*: 100