Province of the
EASTERN CAPE
EDUCATION

NATIONAL SENIOR CERTIFICATE

GRADE 11

MATHEMATICS – THIRD PAPER

MEMORANDUM

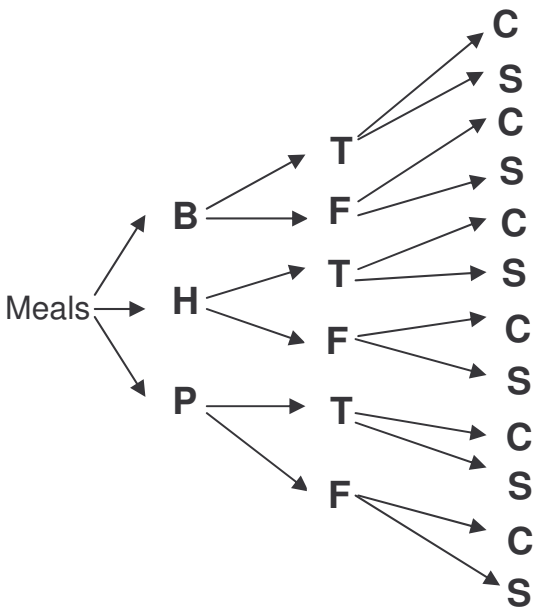
NOVEMBER 2009

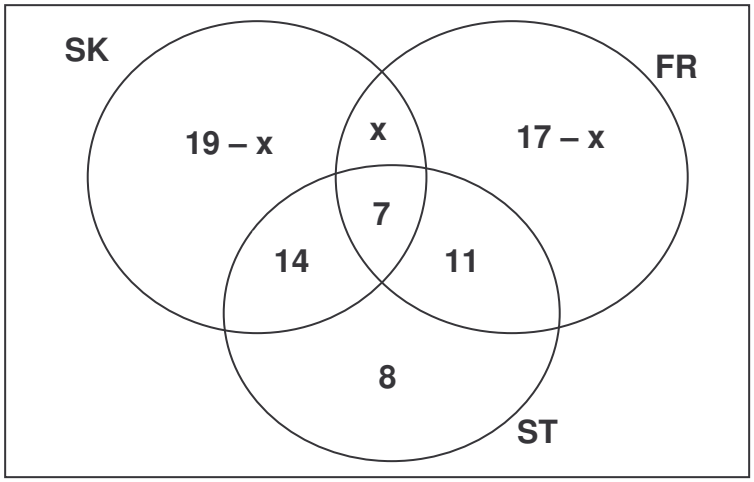
MARKS: 100

TIME: 2 hours

This memorandum consists of 8 pages.

QUESTION 1				
1.1	1.1.1	P(that no jobs will be lost) = 1 – (0,5 + 0,2 + 0,05) = 0,25 OR by using a Venn diagram	(2)	✓ Formula ✓ answer
	1.1.2	Job losses in production and management sections are mutually inclusive because P(P and M) ≠ 0	(2)	✓ mutually inclusive ✓ P(P and M) ≠ 0
1.2	1.2.1	a = 5 b = 10 c = 120 d = 55 e = 50 f = 110	(3)	✓✓✓ answers (1 mark per two values)
	1.2.2	P(worthy of Permanent) x P(production line A) $= \frac{110}{120} \times \frac{65}{120} = 0{,}4965 \ldots$ P(worthy of Permanent appointment and production line A) $= \frac{60}{120} = 0{,}5$ NO. It is independent because the answers above are very close.	(4)	✓ answer ✓ answer ✓ NO/independent ✓ reason
			[11]	

QUESTION 2			
2.1		(6)	✓ branch BTC and BTS ✓ branch BFC and BFS ✓ branch HTC and HTS ✓branch HFC and HFS ✓ branch PTC and PTS ✓ branch PFC and PFS
2.2	There are 3 x 2 x 2 = 12 different combinations.	(1)	✓ answer = 12
2.3	P(B and F) = $\frac{1}{3} \times \frac{1}{2} = \frac{1}{6}$ OR P(B and F) = $\frac{2}{12} = \frac{1}{6}$	(2)	✓ rule ✓ answer
		[9]	

QUESTION 3			
3.1		(8)	✓ for 7 ✓ for 12 ✓ for 14 ✓ for 11 ✓ for x ✓ for 19 – x ✓ for 17 – x ✓ for 8
3.2	Workers who did not take any of the three mentioned type of leave = (80 – 68) = 12.	(1)	✓ answer
3.3	Workers who took sick leave and family responsibility leave but not study leave are equal to x. ∴ 19 – x +17 – x + 14 + 7 + 11 + 8 + x = 68 76 – x = 68 x = 8	(3)	✓ equation ✓ simplification ✓ answer
		[12]	

QUESTION 4				
4.1	4.1.1	There were 100 000 – 20 000 = 80 000 new jobs created between January and March.	(1)	✓ answer
	4.1.2	No. Fewer jobs were created each month from February to June. The number of new jobs being created is actually decreasing. OR Yes. 100 000 new jobs were created from January to June.	(3)	✓ No ✓ ✓ explanation
4.2	4.2.1	In 2011 the price of bread will be (R8,00 + R1,50) = R9,50. **Also accept** (R8,00 + 23% x R8,00) = R9,85	(1)	✓ answer
	4.2.2	The scale on the y-axis does not start at zero, as well as the interval used on the y-axis. The effect is that the bread price is rising more steeply than is the case.	(2)	✓ does not start at 0 ✓ conclusion
4.3	4.3.1	30	(1)	
	4.3.2	Skewed to the right.	(1)	
	4.3.3	Numbers above and below are equal.	(1)	
	4.3.4	75%	(1)	
	4.3.5	The grade 12 class: inter-quartile range is smaller for the grade 12 class.	(2)	
			[13]	

QUESTION 5				
5.1	Total number of workers who prefer to do a management course $= \frac{12}{60} \times 2\,000 = 400$ workers		(2)	✓ calculation ✓ Answer
5.2	No. Sample is too small (3% only). Sample should be at least 10% of the total number of workers.		(3)	✓ No ✓✓ Explanation
			[5]	
*** FOR QUESTIONS 6 TO 8 FOLLOW THE CANDIDATE'S REASONING ***				
QUESTION 6				
6.1	PQRS is similar to ABCD – sides are proportional		(2)	✓ statement ✓ reason
6.2	6.2.1	$\frac{AB}{PB} = \frac{AC}{QC}$ $QC = \frac{6 \times 2}{8} = \frac{12}{8} = \frac{3}{2}\,mm$	(4)	✓✓ ratios ✓ substitution ✓ answer
	6.2.2	$\frac{BC}{PQ} = \frac{AB}{AP}$ $BC = \frac{8 \times 7{,}5}{6} = 10\,mm$	(4)	✓✓ ratios ✓ substitution ✓ answer
	6.2.3	$AB^2 = 8^2 = 64$; $AC^2 = 6^2 = 36$; $BC^2 = 10^2 = 100$ ∴ ΔABC is a right-angled triangle (satisfies Theorem of Pythagoras)	(3)	✓ side lengths ✓ Pythagoras ✓ conclusion
			[13]	

QUESTION 7				
7.1	7.1.1	In ∆ABP and ∆CBA $\hat{B}\ is\ common$ $A\hat{P}B = C\hat{A}B = 90^0$ (given) $P\hat{A}B = A\hat{C}B\ (third\ angle)$ $\therefore$ ∆ABP /// ∆CBA ($\angle\angle\angle$)	(3)	✓ statement ✓ statement ✓ reason or third angle
	7.1.2	$\frac{AB}{CB} = \frac{AP}{CA}$ $\therefore$ AB x CA = AP x CB	(3)	✓✓ one per ratio ✓ cross multiplication
7.2	7.2.1	$\frac{b+6}{c} = \frac{4\sqrt{5}}{6\sqrt{5}}\ \left(= \frac{2}{3}\right)$ $2c = 3b + 18$ $c = \frac{3b+18}{2}$	(4)	✓✓ ratios ✓ cross multiplication ✓ answer
	7.2.2	$\frac{b}{6} = \frac{4\sqrt{5}}{6\sqrt{5}}\ \left(= \frac{2}{3}\right)$ $3b = 12$ $b = 4$ cm	(3)	✓ ratio ✓ cross multiplication ✓ answer
	7.2.3	$c = \frac{3(4) + 18}{2} = 15\ cm$	(1)	✓ answer
	7.2.4	∆PUT /// ∆RVT $\hat{P} = \hat{R}\ (PQ = QR)$ $P\hat{U}T = T\hat{V}R\ (both = 90^0)$ $\therefore \frac{VR}{PU} = \frac{TR}{PT}$ $VR = \frac{4 \times 6\sqrt{5}}{4\sqrt{5}}$ $VR = 6\ cm$	(5)	✓ ∆PUT /// ∆RVT ✓ reasons ✓ ratios = ✓ substitution ✓ answer
			[19]	

QUESTION 8				
8.1	8.1.1	Parallel to	(1)	✓ answer
	8.1.2	Similar/equiangular	(1)	✓ answer
8.2	8.2.1	$\frac{AP}{AB}=\frac{1}{2}$; $\frac{AT}{AS}=\frac{1}{2}$; $\frac{PT}{BS}=\frac{1}{2}$ $\therefore \Delta APT \ ||| \ \Delta ABS \ [sides\ in\ proportion]$	(4)	✓ ratio ✓ ratio ✓ ratio ✓ reason
	8.2.2	$A\hat{T}P = A\hat{S}B \ [triangles\ similar]$ $\therefore PT \ || \ BS \ [corresponding\ angles\ equal]$ OR may use the Midpoint Theorem	(2)	✓ statement ✓ reason
	8.2.3	$\frac{CS}{CT}=\frac{CR}{CQ}$ $[SR \ || \ TQ]$ $=\frac{1}{3}$	(3)	✓statement/ ratios ✓ reason ✓ answer
	8.2.4	$\Delta CSR \ ||| \ \Delta CTQ \ [equiangular]$ $\frac{SR}{TQ}=\frac{CR}{CQ}=\frac{1}{3}$	(3)	✓ similar triangles ✓ ratios ✓ answer
	8.2.5	$\frac{Area\ of\ \Delta\ CSR}{Area\ of\ \Delta\ CQT}$ $=\frac{\frac{1}{2}\times SR\times CS}{\frac{1}{2}\times TQ\times CT}$ $=\frac{SR}{TQ}\times\frac{CS}{CT}$ $=\frac{1}{3}\times\frac{1}{3}$ $=\frac{1}{9}$	(4)	✓ area top ✓ area bottom ✓ simplification ✓ substitution
			[18]	
		TOTAL:	**100**	