



Province of the
EASTERN CAPE
EDUCATION

**NATIONAL
SENIOR CERTIFICATE**

GRADE 12

SEPTEMBER 2010

**MATHEMATICS – THIRD PAPER
MEMORANDUM**

This memorandum consists of 9 pages.

QUESTION 1			
1.1	$x + 2 = y \dots\dots\dots (1)$ $x + y = 6 \dots\dots\dots (2)$ (1) into (2) : $x + x + 2 = 6$ $2x = 4$ $x = 2$ $y = 4$	(4)	✓ Equations (1) & (2) ✓ substitution ✓ x-value ✓ y-value
1.2	Sum = $2 + 2 + 4 + 6 + 10 = 24$	(1)	✓ answer
		[5]	
QUESTION 2			
2.1	$\frac{300}{1500} \times \frac{100}{1} = 20\%$	(1)	✓ answer
2.2	$\frac{55}{100} \times \frac{1500}{1} = 825 \text{ learners}$	(1)	✓ answer
2.3	Gender ; Different grades ; active in sport or not ; Accept any other factors that make sense.	(2)	✓ answer ✓ answer
2.4	No. This might be a school where soccer is a strong sport code OR most of the learners at the school have some connection with soccer and many schools may not offer soccer as a sporting code.	(2)	✓ No ✓ valid explanation
		[6]	
QUESTION 3			
3.1	$75 - 7,5 = 67,5 \text{ kg}$ $\bar{x} - 1\sigma = 34\%$ $75 + 7,5 = 82,5 \text{ kg}$ $\bar{x} + 1\sigma = 34\%$ $\therefore 68\%$ lies between 67,5 kg and 82,5 kg. $68\% \times 700 = 476 \text{ players}$	(2)	✓ 68% ✓ answer
3.2	$2 \times 48\%$ $= 96\%$	(2)	✓ 48% ✓ answer
3.3	$\approx 2\% \times 700 = 14 \text{ players}$	(2)	✓ 2% ✓ answer
		[6]	

QUESTION 4

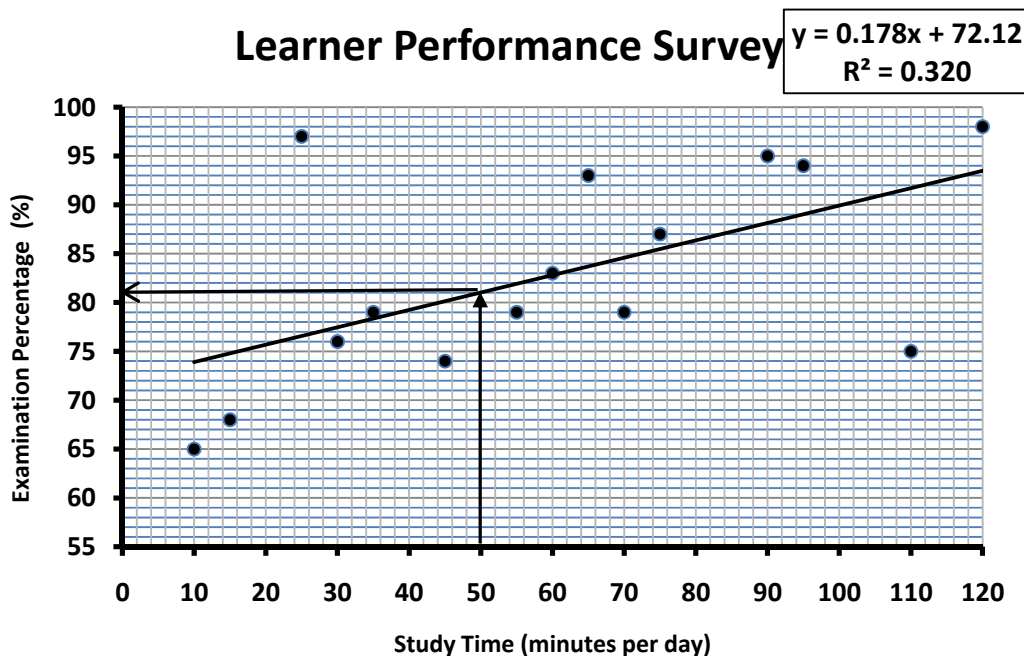
4.1	4.1.1		(6)	✓ 42 and 64 ✓ $28 + x$ ✓ $28 - x$ ✓ x ✓ 14 ✓ 16
	4.1.2	$28 + x + 28 - x + x + 42 + 14 + 16 + 64 + 5 = 200$ $x = 3$	(2)	✓ equation ✓ answer
	4.1.3	86	(2)	✓✓ answer
	4.1.4	$\frac{137}{200} = 68,5\%$	(2)	✓✓ answer
4.2				
	4.2.1	$\frac{2}{3} \times \frac{3}{5} = \frac{6}{15} \text{ or } \frac{2}{5}$	(1)	✓ answer
	4.2.2	$\frac{2}{3} \times \frac{2}{5} = \frac{4}{15}$	(1)	✓ answer
	4.2.3	$\frac{2}{5} + \frac{4}{15} + \frac{1}{5} = \frac{13}{15}$	(3)	✓ $\frac{2}{5}$ and $\frac{4}{15}$ ✓ $\frac{1}{5}$ ✓ answer
			[17]	

QUESTION 5			
5.1	<p>A = learners with previous RCL experience. B = learners in the FET phase</p> <p>$P(A \cap B) = \frac{10}{50} = \frac{1}{5} (0,2)$</p> <p>$P(A) = \frac{20}{50} = \frac{2}{5} (0,4)$</p> <p>$P(B) = \frac{15}{50} = \frac{3}{10} (0,3)$</p> <p>$P(A) \cdot P(B) = 0,4 \times 0,3$ $= 0,12$</p> <p>$\Rightarrow P(A \cap B) \neq P(A) \cdot P(B)$ \therefore events are not independent</p>	(4)	<p>✓ 0,2</p> <p>✓ 0,4 and 0,3</p> <p>✓ 0,12</p> <p>✓ conclusion</p>
5.2	<p>$2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2$ $= 2^8$ $= 256$</p>	(2)	<p>✓ method</p> <p>✓ answer</p>
5.3	<p>${}^8C_3 = \frac{8!}{(8-3)!3!} = 56$</p> <p>OR $\frac{8 \times 7 \times 6}{6} = 56$</p>	(3)	<p>✓ numerator</p> <p>✓ denominator</p> <p>✓ answer</p>
5.4	<p>${}^8P_3 = \frac{8!}{(8-3)!}$</p> <p>$= \frac{8!}{5!}$</p> <p>$= 336$</p>	(2)	<p>✓ method</p> <p>✓ answer</p>
		[11]	

QUESTION 6

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.

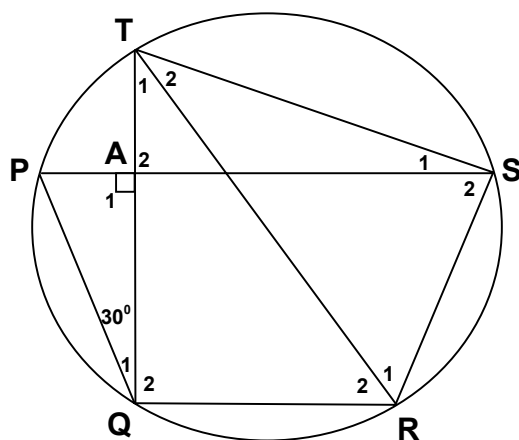
Learner Performance Survey



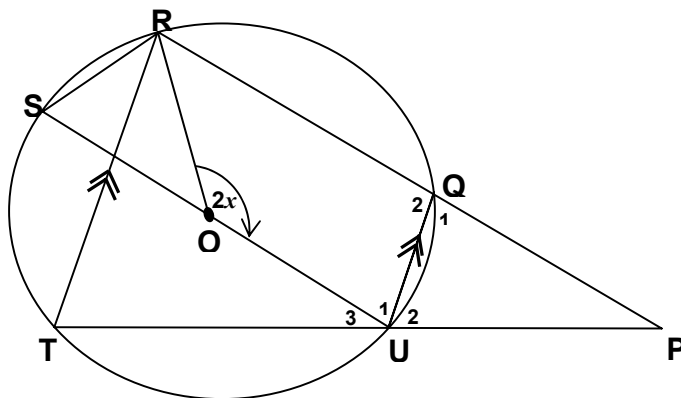
6.1	Learner C and Learner N															(2)	✓✓ answers
6.2	Learner N															(1)	✓ answer
6.3																	
		A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	✓ table
Time	10	15	25	30	35	45	55	60	65	70	75	90	95	110	120		
%	65	68	97	76	79	74	79	83	93	79	87	95	94	75	98		
	r = 0,566 (using calculator)															(2)	✓ answer
6.4	Moderate positive correlation.															(1)	✓ answer
6.5	Equation: $y = 72,12 + 0,178x$															(4)	✓✓ a or b ✓ a or b ✓ equation
6.6	r = 0,925 (using calculator)															(2)	✓ answer ✓ accuracy
6.7	Very strong positive correlation															(2)	✓✓ answer
6.8	81% (Either from graph or by substituting into equation)															(1)	✓ answer
																[15]	

* FOR QUESTIONS 7 TO 10 FOLLOW
CANDIDATES REASONING *

QUESTION 7



7.1	7.1.1	$Q\hat{P}S = 60^\circ$ (Sum of the angles of a triangle)		✓ answer & reason
		$S_2 = 60^\circ$ ($Q\hat{P}S = P\hat{S}R$: given)		✓ answer & reason
		$Q\hat{T}S = 60^\circ$ (angles subtended by same chord)	(3)	✓ answer & reason
	7.1.2	$Q\hat{R}S = 120^\circ$ (opp. angles of cyclic quad – suppl)		✓ statement
		But $\hat{S}_2 + Q\hat{R}S = 180^\circ$		✓ statement
		$\therefore PS \parallel QR$ (Co – interior angles are suppl)	(3)	✓ conclusion
	7.1.3	$\hat{S}_1 = 30^\circ$ (angles are subtended by same chord)		✓ statement
		$T\hat{S}R = 90^\circ$ ($\hat{S}_1 + \hat{S}_2 = 30^\circ + 60^\circ = 90^\circ$)		✓ statement
		$\Rightarrow TR$ is a diameter. (angle in semi-circle = 90°)	(3)	✓ conclusion



7.2	7.2.1	$\hat{T} = x$ (\angle at centre = $2 \times \angle$ at circumference)	(1)	✓ statement
	7.2.2	$\hat{Q}_1 = x$ ($= \hat{T}$: ext \angle of cyclic quad. = opp. int \angle)		✓ statement
		$\hat{U}_2 = x$ ($= \hat{T}$: corresp. \angle 's : $RT \parallel QU$)		✓ statement
		$\hat{P} = 180^\circ - 2x$ (Sum of the angles of a triangle)		✓ statement
		But $R\hat{O}U + \hat{P} = 2x + 180^\circ - 2x = 180^\circ$		✓ conclusion
		$\therefore ROUP$ is a cyclic quad. (opp. \angle 's are suppl.)	(4)	
			[14]	

9.2	$\hat{P}_2 = \hat{S}_2$ (angles subtended by same chord)		✓ statement & reason
	$\hat{S}_2 = \hat{Q}_2$ (isosceles triangle: $RS = RQ$)		✓ statement & reason
	$\hat{Q}_2 = \hat{P}_1$ (angles subtended by same chord)		✓ statement & reason
	$\therefore \hat{P}_1 = \hat{P}_2 \Rightarrow PR$ bisects $Q\hat{P}S$.	(3)	
	OR		
	$\hat{R}_3 = \hat{P}_1$ (Tan – chord Thm)		✓ statement & reason
	$\hat{R}_3 = \hat{S}_2$ (alt. \angle 's : QS//RT)		✓ statement & reason
	$\hat{S}_2 = \hat{P}_2$ (\angle 's subtended by same chord)		✓ statement & reason
	$\therefore \hat{P}_1 = \hat{P}_2 \Rightarrow PR$ bisects $Q\hat{P}S$.		
9.3	In ΔRST and ΔPQR		
	(1) $\hat{R}_1 = \hat{T}$ (from 9.1 above)		✓ statement & reason
	(2) $\hat{S}_3 = P\hat{Q}R$ (Ext. \angle of cyclic quad = opp.int \angle)		✓ statement & reason
	$\therefore \Delta RST \parallel \Delta PQR$ (\angle, \angle, \angle)	(3)	✓ third angle or reason
9.4	$\frac{RS}{PQ} = \frac{ST}{QR}$		✓ statement
	$RS \times QR = PQ \times ST$		
	but, $RS = QR$ (given)		✓ statement
	$\therefore QR^2 = PQ \times ST$	(2)	
		[10]	

