Province of the
EASTERN CAPE
EDUCATION

[redacted]

GRADE 11

NOVEMBER 2010

MATHEMATICS – PAPER 3
MEMORANDUM

MARKS: 100

This memorandum consists of 8 pages.

QUESTION 1

1.1 P(I or J) = P(I) + P(J)
0,41 = 0,25 + P(J)

P(J) = 0,16

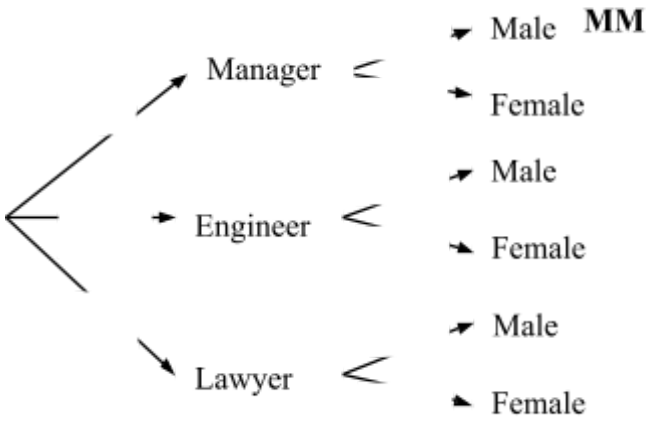
✓ Formula or substitution
✓ answer
(2)

1.2 P(A and B) = P(A) x P(B)

$\frac{1}{12} = \frac{1}{3} \times P(B)$

$P(B) = \frac{1}{4}$

✓ Formula or substitution
✓ answer
(2)



1.3 1.3.1

✓ first branch
✓ values
✓ second branch
✓ values
✓ outcomes
5)

1.3.2 P(Engineer) = $\frac{5}{10} = \frac{1}{2}$
(2) ✓✓ answer

1.3.3 P(Male) = $\frac{4}{10} = \frac{2}{5}$
(2) ✓✓ answer

1.3.4 P(Not Male Engineer) = 1 – P(Male Engineer)
= 1 – $\frac{3}{10}$
✓ method
(2)

$= \frac{7}{10}$ ✓ answer

(answer only $\frac{2}{2}$)

[15]

QUESTION 2

2.1 a = 350 ; b = 450 ; c = 600 and d = 1250 (4) ✓ ✓✓✓ One mark per answer

2.2 P(Used) = $\frac{650}{1250} = 0,52$ ✓ P(Used)

P(Male) = $\frac{750}{1250} = 0,60$ ✓ P(Male)

P(Used) x P(Male) = 0,52 x 0,60 = 0,31 ✓ Product

P(Male & Used) = $\frac{300}{1250} = 0,24$ ✓ P(M & U)

$\Longrightarrow$ P(U) x P(M) ≠ P(M & U) ✓ deduction

∴ Choice not independent of gender. (6) ✓ conclusion

2.3 $\frac{150}{1250} \times 50\,000 = 6000\ females$ ✓ calculation ✓ answer (2)

2.4 No. The sample size is very small, only 2,5% of a very large crowd population. ✓ No / Yes

Yes. The sample was chosen at random which should be a good representation of the crowd population. (2) ✓ valid explanation

[15]

QUESTION 3

3.1 25 people (1) ✓ answer

3.2 155 + x + 50 + 115 + 75 + 90 + 240 + 25 = 800 ✓ equation

x = 50 (2) ✓ answer

3.3 No. The sample size is far too small. The sample might have been biased in one way or the other. ✓ No ✓ reason (2)

3.4 P(Bus) = $\frac{305}{800}$ = 0,38 ✓ 305 ✓ 800 ✓ answer (3)

3.5 $\frac{265}{800} \times 100 \approx 33\%$ ✓ numerator ✓ denominator ✓ answer (3)

3.6 P(C′ ∩ T ∩ B) = $\frac{50}{800} = \frac{1}{16}$ ✓ 50 ✓ 800 ✓ answer (3)

[14]

QUESTION 4

4.1 Percentage of tickets sold = $\frac{1600000}{3200000} \times 100 = 50\%$ (2) ✓ method ✓ answer

4.2 The reason for this is the scale used on the y-axis. A smaller scale is used with graph A and this causes a steeper gradient. (2) ✓ explanation ✓ explanation

4.3 Graph A, because it definite gives the impression that there is a steep increase in ticket sales. (2) ✓ Graph A ✓ reason

[6]

QUESTION 5

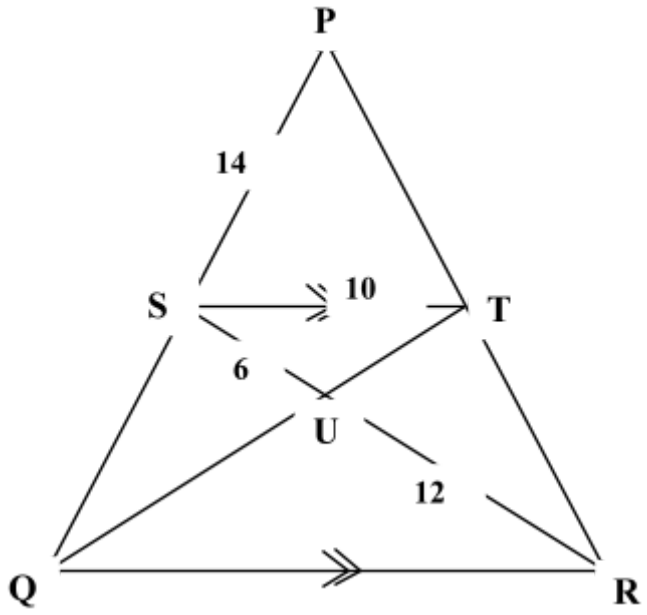
5.1 Option D (2) ✓✓ answer

5.2 The corresponding sides of the figures are proportional. (1) ✓ answer

[3]

*** FOR QUESTIONS 6 TO 8 FOLLOW CANDIDATES REASONING ***

QUESTION 6



6.1 $In\ \Delta SUT\ and\ \Delta RUQ$

1. $\hat{STQ} = \hat{TQR}$ $(alternate\ \angle' s : ST \| QR)$
2. $\hat{TSR} = \hat{SRQ}$ $(alternate\ \angle' s : ST \| QR)$
3. $\hat{SUT} = \hat{QUR}$ $(vertically\ opposite\ \angle' s)$

$\therefore \Delta SUT\ |||\ \Delta RUQ\ (\angle, \angle, \angle)$

(3) ✓ first angle ✓ second angle ✓ third angle or reason

6.2 6.2.1 $\frac{QR}{ST} = \frac{UR}{SU}$

$\frac{QR}{10} = \frac{12}{6}$ ✓ statement or substitution

$\therefore QR = 20\ units$

(2) ✓ answer

6.2.2 In ΔPQR : $\frac{PS}{PQ} = \frac{ST}{QR}$

$\frac{14}{PQ} = \frac{10}{20}$ ✓ statement or substitution

$\therefore\ PQ = 28\ units$ ✓ answer (PQ)

$SQ = 14\ units$

(3) ✓ answer (SQ)

6.3 $\frac{PT}{TR} = \frac{PS}{SQ} = 1$ ✓ statement

$\therefore PT = TR$

$\Rightarrow T\ is\ the\ midpoint\ of\ PR.$

(2) ✓ conclusion

6.4 $\frac{TU}{QT} = \frac{SU}{SR}$

$\frac{TU}{24} = \frac{6}{18}$ ✓ statement or substitution

$TU = 8\ units$ ✓ answer (TU)

$ST^2 = SU^2 + UT^2$ (Pythagoras)

$(10)^2 = (6)^2 + (8)^2$ ✓ Pythagoras

$100 = 36 + 64$

$100 = 100$ ✓ LHS = RHS

$\therefore \Delta\ SUT\ is\ a\ right - angled\ \Delta,\ with\ \hat{SUT} = 90^0$

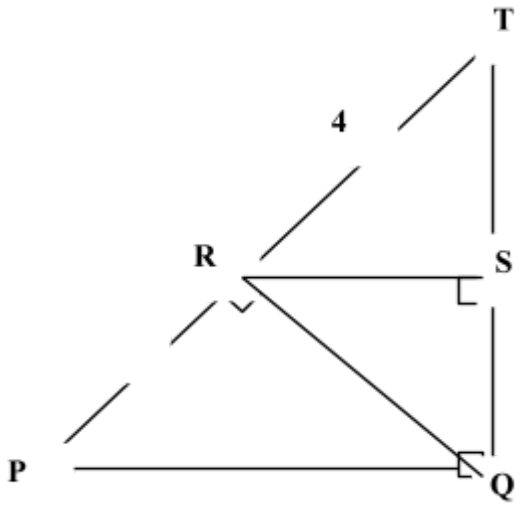
✓ conclusion

$\Rightarrow SR \perp QT\ at\ U.$

(5)

[15]

QUESTION 7



7.1

7.1.1 $In\ \Delta TRQ\ and\ \Delta QRP$

$Let\ \hat{P} = x,\ then\ P\hat{Q}R = 90^0 - x.$

$Then,\ also\ R\hat{Q}T = x$ ✓ reasoning

$1.\ R\hat{Q}T = P\hat{R}Q\ (proven\ above)$ ✓ statement

$2.\ T\hat{R}Q = P\hat{R}Q\ (both = 90^0)$ ✓ statement

$\therefore \Delta TRQ\ ///\ \Delta QRP\ (\angle, \angle, \angle)$ (3)

7.1.2 $\frac{QR}{PR} = \frac{TR}{QR}$ ✓ statement

$QR^2 = TR \times PR$ ✓ QR^2

$= 4 \times \frac{9}{4}$

$= 9$ (4) ✓ substitution

$QR = 3\ units$ ✓ answer

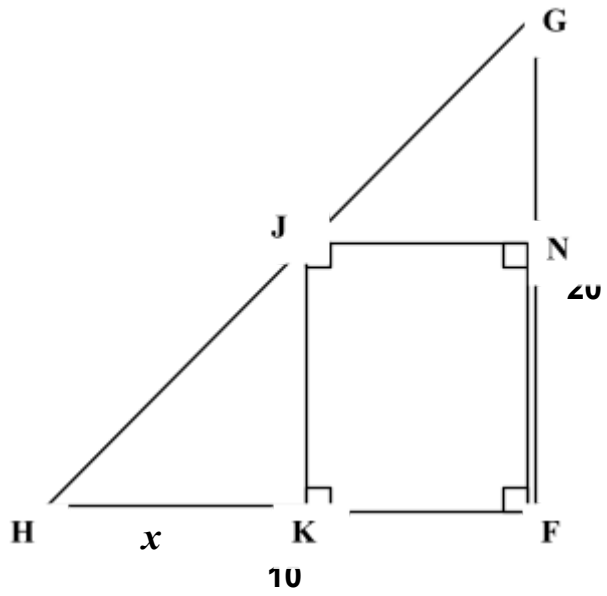
7.1.3 $In\ \Delta TRQ : TQ = 5\ units\ (Pythagoras)$ ✓ TQ

$\frac{TS}{TQ} = \frac{TR}{PT}\ (RS\ ||PQ)$ ✓ statement

$TS = \frac{4 \times 5}{\frac{25}{4}}$ ✓ substitution

$= \frac{16}{5}\ units$ (4) ✓ answer

7.2



7.2.1 $In\ \Delta GHF\ and\ \Delta JHK$

1. $\hat{H}\ is\ common$ ✓ statement
2. $G\hat{F}H = J\hat{K}H\ (both = 90^0)$ ✓ statement
3. $H\hat{G}F = H\hat{J}K\ (corresponding\ \angle' s)$ ✓ third angle or reason

$\Delta GHF\ ///\ \Delta JHK\ (\angle, \angle, \angle)$ (3)

7.2.2 $\frac{JK}{GF} = \frac{HK}{HF}$ ✓ statement

$JK = \frac{20 \times x}{10} = 2x$ (2) ✓ answer

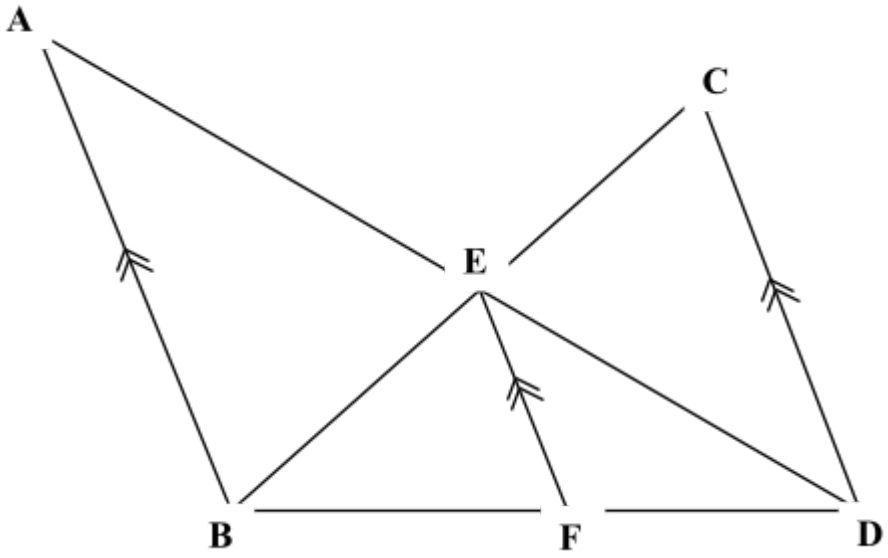
7.2.3 $Area\ of\ rectangle = l \times b$ ✓ formula
$= JK \times KF$ ✓ KF
$= 2x \times (10 - x)$ ✓ substitution
$= -2x^2 + 20x$ **NB** – no mark for answer.

7.2.4 $Area\ of\ \Delta HJK = ½(HK)(JK)$ ✓ formula or substitution
$25 = ½(x)(2x)$
$25 = x^2$ ✓ x = 5
$\therefore x = 5\ units$

$\frac{Area\ of\ rectangle\ JKFN}{Area\ of\ triangle\ GHF} = \frac{l \times b}{½(b \times h)} = \frac{10 \times 5}{½(10)(20)}$ ✓ formulae
$= \frac{50}{100} = \frac{1}{2}$ ✓ substitution
(5) ✓ answer

[24]

QUESTION 8



8.1 $\frac{BE}{EC}$

(1) ✓ answer

8.2 8.2.1 $\frac{EF}{CD} = \frac{1}{2}$

(1) ✓ answer

8.2.2 $\frac{Area\ of\ \Delta BEF}{Area\ of\ \Delta BED}$

$= \frac{½ \times BF \times h}{½ \times BD \times h}$ $(\Delta' s\ between\ same\ parallel\ lines)$

$= \frac{BF}{BD} = \frac{1}{2}$

✓ statement

(2) ✓ answer

8.2.3 $\frac{Area\ of\ \Delta\ BEF}{Area\ of\ \Delta\ ABD} = \frac{Area\ of\ \Delta\ BEF}{Area\ of\ \Delta\ BED} \times \frac{Area\ of\ \Delta\ BED}{Area\ of\ \Delta\ ABD}$ ✓ statement

$\frac{Area\ of\ \Delta\ BEF}{Area\ of\ \Delta\ BED} = \frac{1}{2} \quad (from\ 8.2.2)$ ✓ first fraction

$\frac{Area\ of\ \Delta\ BED}{Area\ of\ \Delta\ ABD} = \frac{ED}{AD} = \frac{1}{2}\ (\Delta's\ betw\ same\ ||\ lines)$ ✓ second fraction

$= \frac{1}{2} \times \frac{1}{2}$

$= \frac{1}{4}$ ✓ answer

(4)

[8]

TOTAL: 100