WESTERN REGION

2006
TRIAL HIGHER SCHOOL CERTIFICATE
EXAMINATION

General Mathematics

SOLUTIONS

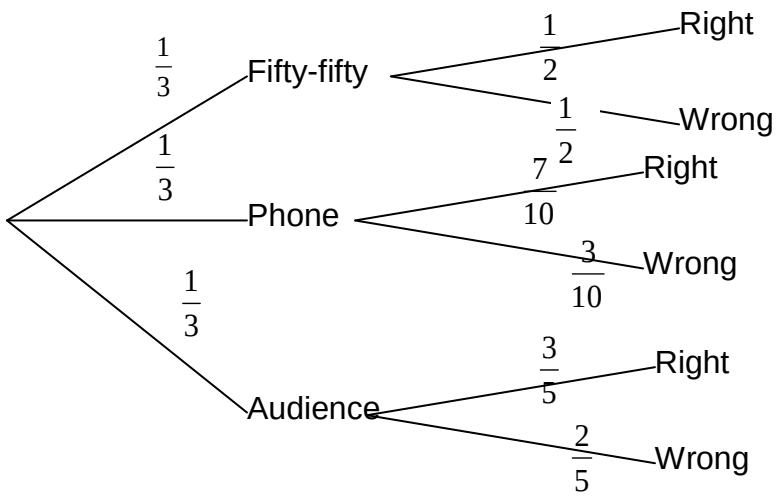
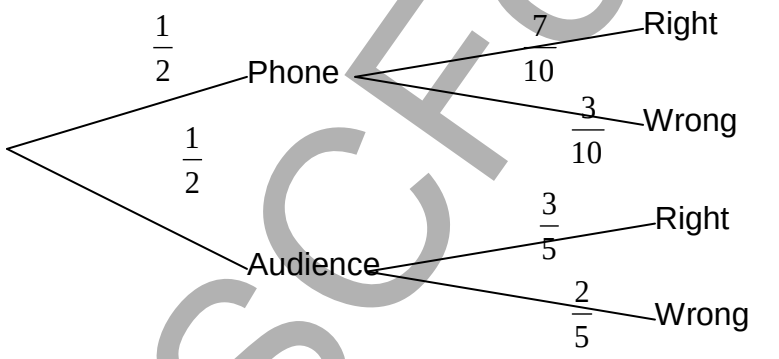
Multiple Choice Answer Sheet

Name _____Marking Sheet___

Completely fill the response oval representing the most correct answer.

1.	A ○	B ○	C ○	D ●
2.	A ○	B ●	C ○	D ○
3.	A ○	B ●	C ○	D ○
4.	A ○	B ○	C ●	D ○
5.	A ○	B ○	C ○	D ●
6.	A ○	B ○	C ●	D ○
7.	A ●	B ○	C ○	D ○
8.	A ○	B ●	C ○	D ○
9.	A ●	B ○	C ○	D ○
10.	A ●	B ○	C ○	D ○
11.	A ○	B ○	C ●	D ○
12.	A ○	B ○	C ○	D ●
13.	A ○	B ●	C ○	D ○
14.	A ○	B ●	C ○	D ○
15.	A ○	B ○	C ●	D ○
16.	A ●	B ○	C ○	D ○
17.	A ○	B ○	C ○	D ●
18.	A ○	B ○	C ●	D ○
19.	A ○	B ○	C ●	D ○
20.	A ○	B ●	C ○	D ○
21.	A ○	B ○	C ○	D ●
22.	A ●	B ○	C ○	D ○

	2006 General Maths Section II	Marks	Comments
23 (a)	i) Arrangements = $12 \times 11 \times 10 = 1320$	1	
	ii) Arrangements = $12 \times 12 \times 12 = 1728$	1	
	iii) Number of ways 3 flavours can be arranged = $3 \times 2 \times 1 = 6$ Combinations = $1320 \div 6 = 220$	2	
(b)	(i) Distance home and back = 50 km. 15 L/100 km = 7.5 L/50 km Or Number of litres = $15 \div 100 \times 50 = 7.5$ litres 7.5 litres would be used.	1	
	(ii) 7.5 L × \$1.20 = \$9.00	1	
	(iii) Number of litres = $\$12.50 \div \$1.20 = 10.42$ L (2 d.p.)	1	
	(iv) Require the distance travelled with 10.42 L 15 L / 100 km 1 L / $100 \div 15 = 6.6$ km 10.42 L / $6.6 \times 10.42 = 69$ km (nearest km)	1	

	2006 General Maths Section II	Marks	Comments
23 (c)	i)  	1	
	ii) P(Right) = $\frac{1}{3}\times\frac{1}{2}+\frac{1}{3}\times\frac{7}{10}+\frac{1}{3}\times\frac{3}{5}=\frac{1}{6}+\frac{7}{30}+\frac{1}{5}=\frac{3}{5}$	2	
	iii)  	2	
	P(Right) = $\frac{1}{2}\times\frac{7}{10}+\frac{1}{2}\times\frac{3}{5}=\frac{7}{20}+\frac{3}{10}=\frac{13}{20}$		

	2006 General Maths Section II	Marks	Comments
24.	(a) i) Trial group 108 Control group 129	1	
	(ii) The range is the same for the two groups as is the interquartile range, but the location of the quartiles and median indicates that the trial group had considerably lower blood pressures on the whole.	2	
	(iii) The trial group was positively skewed and the control group was negatively skewed.	1	
	(b) i) $C = 500D^3 = 500 \times 0.4^3 = 32$ litres	1	
	ii) $C = 500D^3$ $4000 = 500D^3$ $8 = D^3$ $D = 2$ m	1	
	iii) Number of tanks $= \frac{4000}{32}$ $= 125$ tanks	1	
	iv) $C = 500D^3$ $\frac{C}{500} = D^3$ $D = \sqrt[3]{\frac{C}{500}}$	1	
	v) $D = \sqrt[3]{\frac{C}{500}}$ and $R = \frac{D}{2}$ $2R = \sqrt[3]{\frac{C}{500}}$ $R = \frac{\sqrt[3]{\frac{C}{500}}}{2}$	1	

	2006 General Maths Section II	Marks	Comments
24	(c) i) Amount $= \frac{497}{7} \times 45 = \$3195$ million ii) Amount $= 497 \times 1.2 = \$596$ million (nearest million) iii) Increase in Pay TV $= 112 \times .2 = \$33.6$ Million Increase in Radio $= 840 \times 0.07 = \$58.8$ Million Radio had the biggest increase. (by \$25.2million)	1 1 2	

	2006 General Maths Section II	Marks	Comments
25			

(a) i) From table 10% for 4 years gives 4.64100 — 1

For \$ 6000 amount is $4.64100 \times 6000 = \$\,27\,846$

ii) From table 15% for 5 years gives 6.74238 — 2

Amount to invest = $40\,000 \div 6.74238$

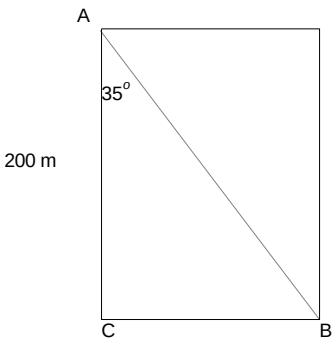
= \$5933 (nearest dollar)

iii) Dollar rate = $13\,890 \div 4000 = 3.4725$ — 2

In the table on the 3 yr line 3.4725 is in the 15% column.

Interest rate was 15%

b) i)



$\tan 35^\circ = \frac{BC}{200}$

$BC = 200\tan 35^\circ$ — 1

= 140 metres (nearest m)

Distance walked = 140 + 200 = 340 m — 2

ii)

$AB^2 = 200^2 + AC^2$

$= 200^2 + 140.02^2$ Or use sin to find AB

$= 59611.6$

AB = 244 metres (nearest m)

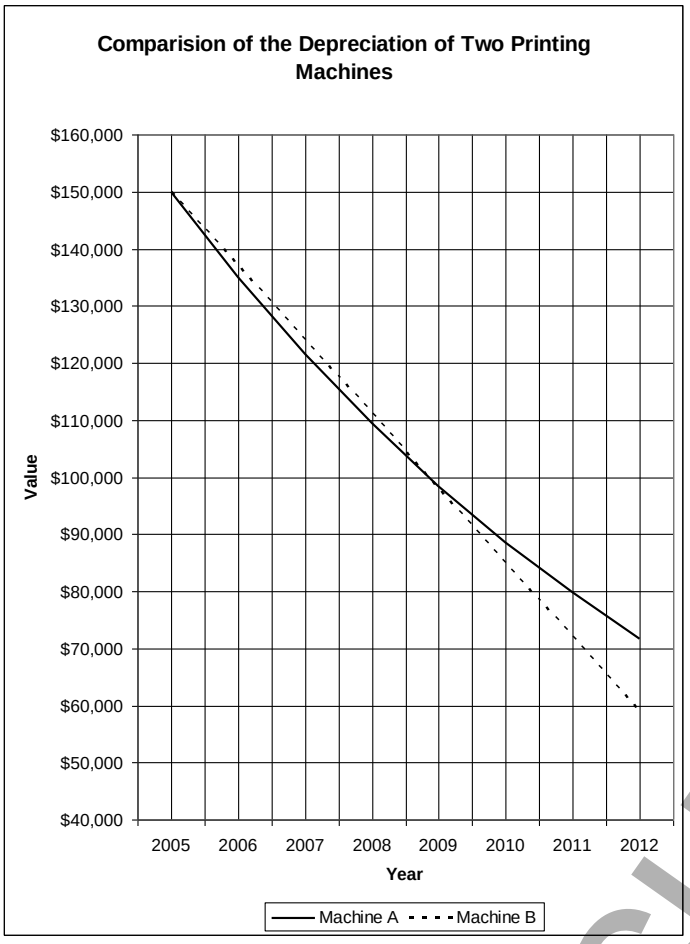
Dominica walks 200 + 140 = 340 metres

Difference = 340 - 244

Pietro's distance is shorter by 96 metres.

	2006 General Maths Section II	Marks	Comments
	(c) i) Probability of Ace = $\frac{4}{52} = \frac{1}{13}$ Expected number of times = $\frac{1}{13} \times 40 = 3$ (nearest whole no.)	1	
	ii) Financial expectation = $\$2 \times \frac{1}{13} + \$1 \times \frac{3}{13} + \$0 \times \frac{1}{13} - \$2 \times \frac{8}{13}$ $= - - \frac{11}{13} = -\$0.85$	2	
	iii) Financial expectation = 0 $\$x \times \frac{1}{13} + \$1 \times \frac{3}{13} + \$0 \times \frac{1}{13} - \$2 \times \frac{8}{13} = 0$ $\frac{x}{13} - 1 = 0$ $\frac{x}{13} = 1$ $x = 13$ Would need to pay \$13 for an Ace to make the game fair. Could also be done by trial and error.	2	

	2006 General Maths Section II	Marks	Comments
26	a) i)		



2

ii) In 2009, from the graph. 1

iii) Value = $150000 \times 0.9^{10} = \$52\,302$ (Nearest \$) 1

(b) Interest =

$11 \times 0.00049 \times 750 + 7 \times 0.00049 \times 950 + 13 \times 0.00049 \times 650$ 2

$= 4.0425 + 3.2585 + 4.1405$

$= 11.4415 = \$11.44$ (nearest cent)

Also accept

$11 \times 0.00049 \times 750 + 6 \times 0.00049 \times 950 + 14 \times 0.00049 \times 650$

$= \$11.29$ (nearest cent)

	2006 General Maths Section II	Marks	Comments
	(c) (i) $z = \frac{x - \bar{x}}{s}$ $= \frac{43 - 55}{6} = -\frac{12}{6} = -2$	1	
	(ii) $z = \frac{x - \bar{x}}{s}$ $1 = \frac{x - 55}{6}$ $x - 55 = 6$ $x = 61$ Pulse rate is 61.	1	
	(iii) Joanne lies on 2 sd below mean. 95% lie within 2 sd of mean 47.5% lie between 2 sd below and the mean Adam lies on 1 sd above mean. 68% lie within 1 sd of mean 34% lie between 1 sd above and the mean Percentage between Joanne and Adam = 34% + 47.5% = 81.5%	2	
	(d) i) $N = M\left\{\frac{(1+r)^n - 1}{r(1+r)^n}\right\}$ N= 200 000 n = $15 \times 12 = 180$ r = $\frac{9}{12} = 0.75\% = 0.0075$	1	
	ii) $200\,000 = \frac{M\left((1.0075)^{180} - 1\right)}{0.0075(1.0075)^{180}}$ $200\,000 = 98.59 \times M$ $M = \frac{200000}{98.59}$ M = \$2028.53 M= \$ 2029 (to nearest dollar)	2	

	2006 General Maths Section II	Marks	Comments
27	(a) (i) Home Games Mean = 20.2 SD = 9.7 Away Games Mean = 16.2 SD = 9.7	2	
	(ii) The statistics indicate that the team performs consistently better in home games,with a higher mean, but same SD.	2	
	(b) i) Angular distance = $20^\circ + 25^\circ = 45^\circ$ Dist in km = $2 \times \pi \times 6400 \times \frac{45}{360} = 5026.5$ Dist in N Miles = $\frac{5026.54}{1.852} = 2714$ M	2	
	ii) Angular distance = $20^\circ + 25^\circ = 45^\circ$ 15° = 1 hour 45° = 3 hours Ship B is 24-3=21 hours behind Ship A. Time in ship B is 9 a.m.on Friday 28th March	2	
	(c) Area = $\frac{1}{2}ab\sin C$ $= \frac{1}{2} \times 6.5 \times 4.8 \times \sin 55^\circ 27'$ $= 12.8$ km^2 (3 sig fig)	2	
	(d) i) Gradient = $\frac{15}{30} = \frac{25}{50} = \frac{1}{2}$ Intercept = 15 Equation $R = \frac{1}{2}T + 15$	2	
	ii) $R = \frac{1}{2}T + 15$ $= \frac{1}{2} \times 80 + 15$ = 55 beat/min	1	
	a) i) External radius = 15 m		

	2006 General Maths Section II	Marks	Comments
28	Internal radius = 14 m Height = 18 m External Volume = $\pi r^2 h$ $= \pi \times 15^2 \times 18$ $= 12723.5$ (1 dec place) Internal Volume = $\pi r^2 h$ $= \pi \times 14^2 \times 18$ $= 11083.5$ (1 dec place) Volume of walls = 12723.5 – 11083.5 = 1640 (nearest cubic metre.)	1	
	ii) Radius = 15 metres. Total Surface area = $\frac{1}{2} \times 4\pi r^2 = 2 \times \pi \times 15^2$ = 1413.7 sq metres Surface area after slot= 95% of 1413.7 = 1343 sq metres (nearest sq	2	
	iii) Internal Volume cylinder = $\pi r^2 h$ $= \pi \times 14^2 \times 18$ $= 11083.5$ (1 dec place) Internal Volume hemisphere = $\frac{1}{2} \times \frac{4}{3} \pi r^3$ $= \frac{2}{3} \times \pi \times 14^3$ = 5747.0(1 dec place) Total internal volume = 11 083.5 + 5747.0 = 16 831 m^3	2	
	iv) Remaining volume after walls etc = 16 831 – 3500 = 13 331 Conditioner circulates 120 m^3 per minute. Time to circulate all air = 13 331 ÷ 120 =111.09 = 111 min or 1 hrs 50 min (to nearest ten minutes)	2	

	2006 General Maths Section II	Marks	Comments
	b) i) After 4 seconds at a height of 80 metres.	2	1 for time and 1 for height
	ii) The plane has climbed the greater distance in the first 2 seconds, but the rocket has climbed the greater distance in the first 6 seconds. This shows that the speed of the rocket is increasing. (It is accelerating.)	2	
	iii) Using the cosine rule $RP^2 = 180^2 + 140^2 - 2 \times 180 \times 140 \times \cos 65^\circ$ $= 30700.04$ RP = 175 m (nearest metre)	2	