WESTERN REGION

2009
TRIAL HSC
EXAMINATION

General Mathematics

SOLUTIONS

General Mathematics Trial HSC Examination 2009

Multiple Choice Answer Sheet

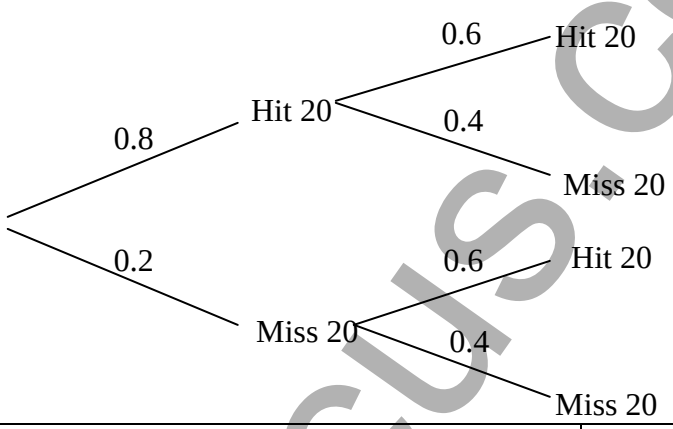
Name Marking Sheet .

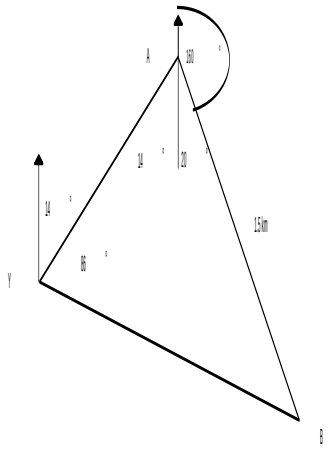
Completely fill the response oval representing the most correct answer.

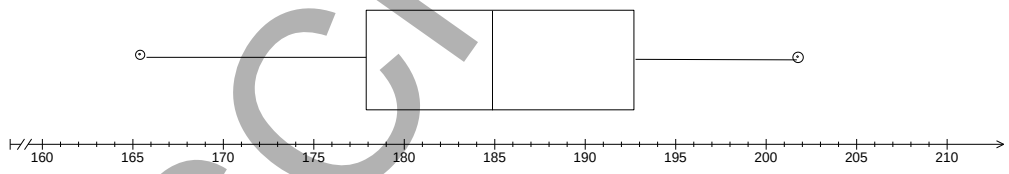
1.	A ○	B ●	C ○	D ○
2.	A ○	B ○	C ○	D ●
3.	A ○	B ○	C ●	D ○
4.	A ○	B ●	C ○	D ○
5.	A ●	B ○	C ○	D ○
6.	A ○	B ○	C ○	D ●
7.	A ○	B ●	C ○	D ○
8.	A ○	B ●	C ○	D ○
9.	A ○	B ○	C ●	D ○
10.	A ○	B ●	C ○	D ○
11.	A ○	B ○	C ○	D ●
12.	A ○	B ○	C ●	D ○
13.	A ●	B ○	C ○	D ○
14.	A ○	B ○	C ●	D ○
15.	A ○	B ○	C ○	D ●
16.	A ●	B ○	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 ○

Question 23	HSC Trial Examination-	2009	
Part	Solution	Marks	Comment
(a) (i)	Attendance in NSW = 630 000 – 410 000 =220 000	1	
(a) (ii)	Queensland had the highest attendance of any state in 2004 then decreased over the following years, while WA only began in 2005 and grew steadily each year after that.	2	1 for decrease in Qld and 1 for increase in WA
(b)	5 L/s = $5 \times 60 \times 60$ L/h = 18000 L/h = 18000 ÷ 1000 kL /h = 18 kL /h	1	
(c) (i)	$Area = \pi ab$ $= \pi \times 1.2 \times 2.3$ $= 8.7\ m^2$	1	
(c) (ii)	Volume tank = Ah $= 8.7 \times 10.4$ $= 90.2\ m^3$ Volume sphere = $\frac{4}{3}\pi r^3$ $= \frac{4}{3} \times \pi \times (15)^3$ $= 14\ 137\ m^3$ Number of refills = 14 137 ÷ 90.2 = 156.77 = 156 complete refills	2	
(d)	$5x + 3(2 - x) = \frac{2x}{3} + 12$ $5x + 6 - 3x = \frac{2x}{3} + 12$ $2x + 6 = \frac{2x}{3} + 12$ $2x = \frac{2x}{3} + 6$ $6x = 2x + 18$ $4x = 18$ $x = 4.5$	3	3 marks for complete solution 2 marks if 1 or 2 simple errors made 1 mark if some correct manipulation done
(e)	Angle $=72^o$ Percentage = $\frac{72}{360} \times 100$ = 20%	1	
(f)	Cost of separate parcels = \$30.00 + \$50.00 = \$80.00 *Cost of single parcel (5.5 kg)* = \$65.00 Saving = \$15.00	2	2 marks for correct answer 1 mark if single error

Question 24	HSC Trial Examination-	2009	
Part	Solution	Marks	Comment
(a) (i)	Fortnightly net pay = 46 800 ÷ 26 – 480 = \$1 320	1	
(a) (ii)	Taxable income = 46 800 + 480 – 1 500 = \$45 780	1	
(a) (iii)	Income tax = 11 400 + 0.50 × 780 = \$11 790 Medicare levy = 0.015 × 45 780 = \$686.70 Tax due = 686.70 + 11 790 = \$12 476.70	2	2 marks for final result 1 mark if Income tax or Medicare is correct
(a) (iv)	Tax Paid = \$480 × 26 = \$12 480 Tax Refund = \$12 480 – \$12 476.70 = \$3.30 refund	1	
(b) (i)	12 – 4 = 18 – 10 = 8	1	
(b) (ii)	$P(Success) = \frac{38}{50}$ $= \frac{19}{25} = 0.76$	1	
(b) (iii)	$P(\text{Success given predicted success}) = \frac{28}{32}$ $= \frac{7}{8} = 0.875$	1	
(b) (iv)	$P(\text{Failure given predicted failure}) = \frac{8}{18}$ $= \frac{4}{9} = 0.444$ She is better at predicting success as she was right 87.5% of the time when she predicted success but only 44.4% when she predicted failure.	2	1 for working put failure 1 for reason
(c) (i)	$N = M\left\{\frac{(1+r)^n - 1}{r(1+r)^n}\right\}$ $25\,000 = M\left\{\frac{(1.01)^{72} - 1}{0.01(1.01)^{72}}\right\}$ 25 000 = 51.1 M $M = \frac{25000}{51.1}$ = \$488.75	2	1 for sub in formula correctly 1 for calculating answer
(c) (ii)	Interest = 488.75 × 72 – 25 000 = 35 190 – 25 000 = \$10 190	1	Accept 10 191

Question 25	HSC Trial Examination-	2009	
Part	Solution	Marks	Comment
(a) (i)	Hyperbola	1	
(a) (ii)	600 m	1	
(a) (iii)	240 to 250 m	1	
(a) (iv)	Width 800, length 75, perimeter 1750m Width 300, length 200 perimeter 1000m The 300 m width paddock would be cheaper to fence.	1	
(b) (i)	Mikes dart Lydias Dart  		1
(b) (ii)	$P(H\,H) = 0.8 \times 0.6$ $= 0.48$	1	
(b) (iii)	$P(H\,M) + P(M\,H) = 0.8 \times 0.4 + 0.2 \times 0.6$ $= 0.32 + 0.12$ $= 0.44$	1	
(b) (iv)	P (at least one H) $= 0.48 + 0.44$ $= 0.92$ OR P (at least one H) $= 1 - P(M\,M)$ $= 1 - 0.2 \times 0.4$ $= 0.92$	1	
(c) (i)	$\frac{YB}{\sin 34^\circ} = \frac{1.5}{\sin 86^\circ}$ $YB = \frac{1.5}{\sin 86^\circ}(\sin 34^\circ)$ $= 0.841$ km	2	1 for sub in sine rule 1 for calculation
(c) (ii)	$XB^2 = 2.4^2 + 1.5^2 - 2 \times 2.4 \times 1.5 \times \cos 75^\circ$ $= 6.15$ $XB = 2.5$ km	2	1 for sub in cosine rule 1 for calculation

(c) (iii)	Bearing is $86^o + 14^o = 100^oT$ 	1	

Question 26	HSC Trial Examination-	2009	
Part	Solution	Marks	Comment
(a) (i)	No combinations = 16 × 15 = 240 combinations	1	
(a) (ii)	Combinations of 4 players from 14 players = 14 × 13 × 12 × 11 = 24024 combinations Order isn't important, so arrangements 4 = 4 × 3 × 2 × 1 = 24 So number of ways of selecting rest of team = 24024 ÷ 24 = 1001	1	
(b) (i)	$P(BB) = \frac{40}{90} \times \frac{35}{80}$ $= \frac{7}{36}$	1	
(b) (ii)	P(B and G) = P(BG) + P(GB) $= \frac{40}{90} \times \frac{45}{80} + \frac{50}{90} \times \frac{35}{80}$ $= \frac{71}{144}$	1	
(c) (i)	$S = V_0(1-r)^n$ $= 5800(1-0.3)^6$ = \$682.36	2	
(c) (ii)	$S = V_0(1-r)^n$ OR $S = V_0 - Dn$ $= 5800(1-0.3)^3$ $= 5800 - 1\,200 \times 3$ = \$1989.40 = \$2 200.00 Straight line gives greater value	2	
(d) (i)	Number of players from Western = 8% of 250 = 20 players	1	
(d) (ii)	*Min Ext* = 166 Q_1 = 178 Q_2(*median*) = 185 Q_3 = 193 *Upper Ext* = 202 	3	1 each for Extremes Median Quartiles
(d) (iii)	Sample SD = 10.85	1	

Question 27	HSC Trial Examination-	2009	
Part	Solution	Marks	Comment
(a) (i)	Angular distance $= 10^\circ + 30^\circ = 40^\circ$ Distance $= 40 \times 60\ M$ $= 2\,400\ M$	2	1 for Ang dist 1 for dist
(a) (ii)	Time = distance/speed $= \frac{2400}{15}$ $= 160$ hours $= 6\frac{2}{3}$ days or 6 days 16hrs	1	
(a) (iii)	40° longitude difference $\Rightarrow 40 \times$ 4 minutes time difference FI is 2 hrs and 40 min later and on other side of Date line Time on FI is 6:30 + 2:40 = 9:10 am on Friday 14th August.	2	1 for time 1 for date
(b) (i)	Deposit $= 0.2 \times 1750$ $=$ \$350.00 Payments $= 24 \times$ \$95.70 $=$ \$2 296.80 Total Paid = \$2 296.80 + \$350.00 $=$ \$2 646.80 Interest = \$2 646.80 - 1750.00 $=$ \$896.80	2	1 for payments 1 for extra paid
(b) (ii)	Interest Rate $= \frac{\$896.80}{1400} \div 2$ $= 32\%$ p.a.	1	
(c)	$I \propto \frac{1}{d^2}$ $I = \frac{k}{d^2}$ $25 = \frac{k}{40^2}$ $k = 40\,000$ $I = \frac{40000}{d^2}$ $= \frac{40000}{50^2}$ $= 16$ metres	3	1 for equation 1 for value of k 1 for answer

(d)	Rate per day = 0.0003835			2	Allow for rounding errors Accept $2.25 - $2.35
	Amount	Days Interest	Interest to 5th Aug		
	68.00	34	0.8867		
	53.50	20	0.4104		
	40.00	13	0.1995		
	105.50	10	0.4047		
	150.80	7	0.4049		
Total Interest = $ 2.31					

Question 28	HSC Trial Examination-	2009	
Part	Solution	Marks	Comment
(a) (i)	Geog $z_G = \frac{67-55}{8} = 1.5$ Hist $z_H = \frac{72-60}{12} = 1$ Geography result is better.	2	1 finding each z score
(a) (ii)	Z score = $\frac{63-55}{8} = 1$ 68% lie between 1 and -1 34% lie between 0 and 1 16% greater than 1	1	
(a) (iii)	5% lie outside -2 and 2 so 2.5% lie above 2. Hist z score of 2 = $60 + 2 \times 12 = 84$ (1 above) Geog z score of 2 = $55 + 2 \times 8 = 71$ (1 above) 2 students would be invited, Catalina on Hist and Bella on Geog..	2	1 for z scores and 1 for identifying students above
(b) (i)	$YC^2 = 15^2 + 120^2$ $= 14625$ $YC = \sqrt{14625}$ $= 121$ cm (3 *s.f.*)	1	
(b) (ii)	$Area = \frac{1}{2}ab\sin C$ $= \frac{1}{2} \times 15 \times 121 \times \sin 95°$ $= 904$ cm^2	2	1 for substitution 1 for answer
(b) (iii)	$Area\ \Delta ABC = \frac{1}{2} \times 120 \times 45 = 2700$ cm^2 Percentage $= \frac{904}{2700} \times 100 = 33.5\%$	1	Accept any method to get this solution
(c) (i)	A strong positive correlation.	1	
(c) (ii)	Gradient = $\frac{12}{8} = 1.5$	1	
(c) (iii)	$N = 1.5Y + 2$ or equivalent with other variables.	1	
(c) (iv)	$N = 1.5 \times 20 + 2 = 32$ problems	1	