2011 General maths Trial Ascham.

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

23 a) Area $= \pi ab$ $a=12, b=9$

$= \pi \times 12 \times 9$

$= 339.29$

$= 340 cm^2$ (2sf).

b)(i) Area $= \frac{h}{3}(d_F + 4d_m + d_L)$

$= \frac{5}{3}(7.2 + 4\times 8.5 + 3.8)$

$= 75 m^2$

(ii) $V = Ah$

$= 75 \times 1.5$

$= 112.5 m^3$

N° of fish $= \frac{112.5}{1.75}$

$= 64.28$

∴ Max. of 64 fish.

c)(i) $C = 2\pi r$

$1.25 = 2\pi r$

$r = \frac{1.25}{2\pi}$

$= 0.1989 m$

$= 19.89 cm$

$\doteqdot 20 cm$

(ii) $V = \pi r^2 h$

$= \pi \times (0.1989..)^2 \times 1$

$= 0.12433...$

$= 0.124 m^3$ (to 3sf).

(iii) Capacity is 124 L (to nearest L).

d). (i) 15%

(ii) The percentage of glass goes down from 75% to 60%.

Q24 a)(i) IQR $= 350 - 150$

$= 200$

(ii) N° between 300 and 350 is 25% of 2000

$= 500$.

(iii) Positively skewed.

(b) $\bar{x} = 68.5$

(i) $\sigma_n = 21.7$ (Pop^n st. dev.) (to 1dp).

(iii)

	$\bar{x}$	σ_n
Polly	68	16
Molly	68.5	21.7

Polly should receive the prize since her lower st. dev. indicates consistency and both means are similar.

(c) Total n° of students = 720

N° from Y12 in sample $= \frac{100}{720} \times 50$

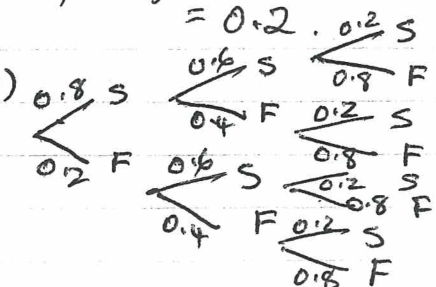
$= 6.94$

∴ 7 students.

(d) (i) P(fails) $= 1 - 0.8$

$= 0.2$.

(ii)



(iii) $P(SSS) = 0.8 \times 0.6 \times 0.2$

$= 0.096$

(iv) P(at least 1 solve) $= 1 - 0.2 \times 0.4 \times 0.8$

$= 0.936$.

Q25

(a)(i) \$70000

(ii) $240 - 168 = 72$ mths

$= \frac{72}{12}$ yrs

$\therefore$ Repays 6 years earlier

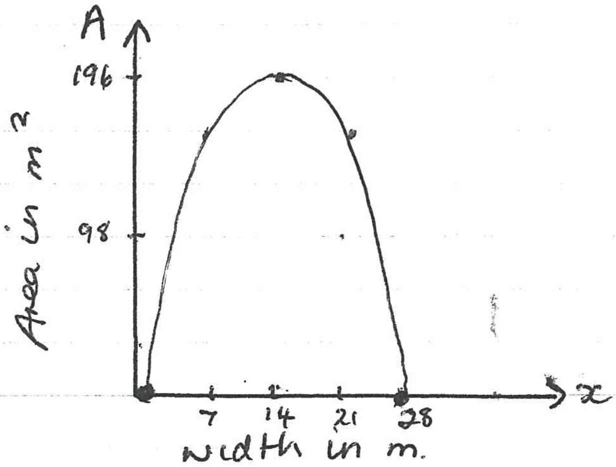
(iii) Amt saved $= \$640 \times 240 - \$740 \times 168$

$= \$29\,280.$

(b)(i) concave down

(ii)

x	0	7	14	21	28
A	0	147	196	147	0



(iii) Max area is $196\,m^2$.

(b) $R = kI^2$

(i) $3.5 = k \times 1.5^2$

$k = \frac{3.5}{1.5^2}$

$= 1.555\ldots$

$= 1.56$ (3 s.f.)

(ii) $2 = 1.56 \times I^2$

$I^2 = \frac{2}{1.56}$

$I = \sqrt{\frac{2}{1.56}}$

$= 1.13\ldots$

$= 1.1$ (2sf)

$\therefore$ Current is 1.1 amps (2s.f.).

Q26

a)(i) $1°$ longitude $\rightarrow$ 4 mins

3h 24 min = 204 mins

longitude diff. $= \frac{204}{4}$

$= 51°$

(ii) Christmas Island is West of Sydney b/c sun rises later.

$\therefore$ Longitude $= (152° - 51°)$E

$= 101°$E

(b) (i) Angular dist $= 31 + 39$

$= 70°$

$\therefore$ Distance $= 70 \times 60$ n.m.

$= 4200$ n.m.

(ii) Time $= \frac{D}{S}$

$= \frac{4200}{240}$

$= 17.5$ hours

(iii) Perth & Beijing on same longitude so no time diff.

Time of arrival = 2pm Sat + 17.5h

= 7.30am Sun.

(iv) (α) Time in F. $= 10^{25}$am $- 7$h

$= 3^{25}$am

(β) Time of arrival $= 3^{25}$am + 18h45min

= 22.10

= 10.10 pm Mon.

(c) (i) $A = 30°$

(ii) $\sin 30° = \frac{900}{d}$

$d = \frac{900}{\sin 30}$

$= 1800$ m.

(iii) $\frac{c}{\sin 25°} = \frac{1800}{\sin 5°}$

$c = \frac{1800}{\sin 5°} \times \sin 25°$

$= 8728.2\ldots$

$\therefore$ Distance is 8728m (to n.m.)

Q27.

a) $I = Prn$

$6.74 = 562.26 \times r \times 25$

$r = \dfrac{6.74}{562.26 \times 25}$

$= 0.00047949..$

$\therefore$ Daily rate is 0.04795% (4sf)

b)(i) Initial value = \$7652

(ii) $S = 7652(0.9)^5$

$= 4518.43..$

$\therefore$ Value after 2.5yrs is \$4518

(iii) Rate per 6mths $= 1 - 0.9$

$= 0.1$

$= 10\%$

Rate per annum $= 20\%$.

(iv) $1000 = 7652(0.9)^n$

$0.9^n = \dfrac{1000}{7652}$

$= 0.13068...$

$n \doteqdot 19.3$ (trial & error).

$\therefore$ It takes $\dfrac{19.3}{2}$ years $= 10$ years (nearest no. of yr)

c)(i) $N = M\left\{\dfrac{(1+r)^n - 1}{(1+r)^n r}\right\}$

$200000 = M\left\{\dfrac{(1.08)^{20} - 1}{(1.08)^{20}\, 0.08}\right\}$

$= M \times 9.818...$

$M = \dfrac{200000}{9.818...}$

$= \$20370.44$

$\therefore$ Annual instalment is \$20370.44.

(ii) Interest $= 20370.44 \times 20 - 200000$

$= \$207408.80$

Q28

a). Graph A.

b)(i) Numbers $= 26 \times 26 \times 10 \times 10 \times 26 \times 26$

$= 45697600$

(ii) Prob^y $= \dfrac{1 \times 1 \times \cancel{10} \times \cancel{10} \times 1 \times 1}{26 \times 26 \times \cancel{10} \times \cancel{10} \times 26 \times 26}$

$= \dfrac{1}{26^4}$

$= \dfrac{1}{456976}$

c)(i) $h^o = 8000 - 5 \times 500$

$= 5500$

(ii) Income $= 5500 \times \$5$

$= \$27500$

(iii) $8000 \div 500 = 16$

$\therefore$ If cost is \$16 no one will attend.

(iv) $P = 8000 - 500D$

using

D	0	1	2	.....	16
P	8000	7500	7000		0

(v)

D	0	2	4	6	8	10	12	14	16
I	0	7000	etc		32000	etc		7000	

$\therefore$ Max income occurs when cost is \$8 per ticket.

Max income = \$32000.

Income $I = D(8000 - 500D)$

which is a quadratic function, concave down.

$\therefore$ A max value exists