

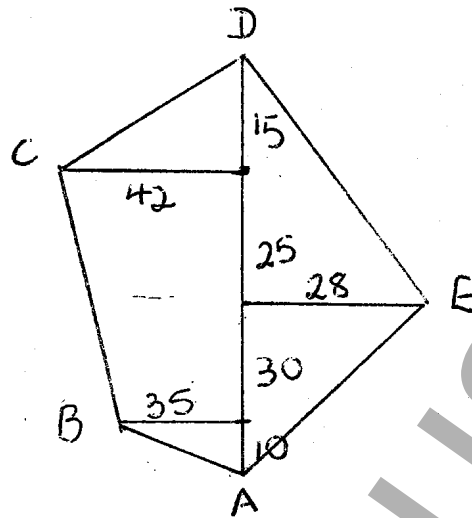
SOLUTIONS

YR 12 GENERAL MATHEMATICS

21

	D	
	80	
C 42	65	
	40	28 E
B 35	10	
	0	
	A	

(i)



(2 marks)

(ii)

$$CD = \sqrt{42^2 + 15^2} \quad (1)$$

$$= 44.6 \text{ m} \quad (1)$$

CD is 45m to nearest metre (1)

(iii)

$$\text{Area park} = \frac{42 \times 15}{2} + \frac{(42+35) \times 25}{2} + \frac{35 \times 10}{2} + \frac{80 \times 28}{2}$$

$$= 3727.5 \text{ m}^2$$

(b)

(i) Cylinder = $\pi r^2 h = \pi \times 0.5^2 \times 6 = 1.8 \pi$ (1)
 Total volume = 6.2 m^3 (2dp)

(ii)

$$6.2 \times 1000 = 6200 \text{ Litres.} \quad (1)$$

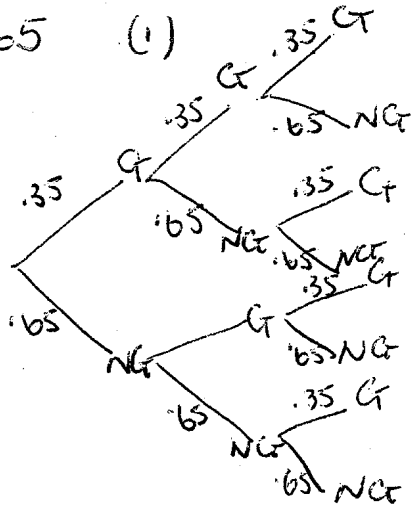
$$\text{Capacity} = 6200 \text{ L} = 6000 \text{ L (nearest 100 L)} \quad (1)$$

(c)

No molecules water / minute = $1.7 \times 10^{21} \times 7.5 \times 10^{-22}$ (1)
 $= 1.28 \times 10^{33}$ (1)

Q22

- a) (i) 0.65 (1)
 (ii)



$$P(3 G) = (0.35)^3 = 0.042875 \quad (1)$$

$$(iii) P(3 NG) = (0.65)^3 = 0.274625 \quad (1)$$

$$(iv) P(\text{at least one green}) = 1 - P(3 NG) = 0.725375 \quad (1)$$

b) i) 43.2%

ii) 0.93%

(iii) 2.63%

(iv) The % of males drowning above 0.05% was 3 times that of the females

c) i) A = \$150990.33 (1)

B = \$1196.66 (1)

C = \$149157.93 (1)

ii) 150000 - C = \$842.07 (1)

Q23.

a) (i) $\$320 \times 60 = \19200 (1)

(ii) Interest = $\$19200 - \$11000 = \$7200$ (1)

(iii) Flat rate interest = $\frac{7200}{12000} \times 100 \div 5 = 12\%$ (1)

(b) $A = 2\pi r(r+h)$

(i) $\frac{A}{2\pi r} = r+h$ (1)

$h = \frac{A}{2\pi r} - r$ (1)

(ii) $h = \frac{678.58}{2 \times \pi \times 3} - 3$
 $= 33 \text{ cm.}$ (1)

(iii) $V = \pi r^2 h$
 $= \pi \times 9 \times 33$
 $= 933.05 \text{ cm}^3$ (1)

c) $\sqrt{5x} - 3 = 4$
 $\sqrt{5x} = 7$ (1)
 $5x = 49$
 $x = 9.8$ (1)

d) (i) $\left(\frac{1}{2}\right)^6 = 0.015625$ (1)

(iii) $\left(\frac{3}{4}\right)^4 = 0.316$ (3 dp) (1)

Q24

a) Simpsons Rule (two applications)

$$\begin{aligned} \text{i) Area} &\doteq \frac{21}{3} (0 + 4 \times 3.0 + 3 \cdot 8) + \frac{21}{3} (3 \cdot 8 + 4 \times 4 \cdot 3 + 0) \quad (1) \\ &= 7 (15 \cdot 8) + 7 (21) \\ &= 257.6 \text{ m}^2 \quad (1) \end{aligned}$$

$$\text{ii) } 257.6 \times 50 = 12880 \text{ m}^3 \quad (1)$$

(b) i) 154 \rightarrow 177 - Range 23cm

ii) Marks For Boys	Minimum	160	
	LQ	167	
(and)	Med	170.5	(1) move max + min correct.
	UQ	174.5	
	Maximum	185	(1) med, LQ UQ correct.

(iii) Agree ~~partly~~ as the boys generally are taller. as the median of boys height is 45cm taller than girls + the UQ + LQ are around 4cm taller. ~~the~~, The range for both groups is similar but the IQR for boys is around half that of the girls which means the boys heights are less spread out than the girls.

- 1 - looking at median for heights
- 1 - IQR for spread.

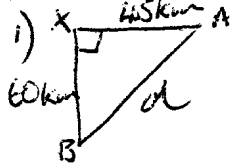
$$\text{c) } 0.8(1.1)^n = 1 \quad \text{let } n=1$$

n	value
1	0.88
2	0.968
3	1.064

The area becomes larger than 1cm during the 3rd month.
 $n = 2.34$ months.

Q25

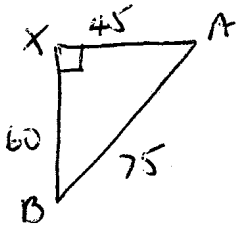
a)



$$d = \sqrt{45^2 + 60^2} = 75 \text{ km}$$

- (i) correct distances for car A + B
- (i) correct use of Pyth.

b)



$$\tan B = \frac{45}{60} = \frac{3}{4} \text{ (or equivalent trig ratio)} \quad (1)$$

$$B = 36.9^\circ$$

$$\therefore B = 37^\circ \text{ to nearest degree} \quad (1)$$

b)

i) \$9600 (1)

ii) use future value $N = \frac{1200(1.09^8 - 1)}{0.09}$

$M = 1200, r = 0.09$

$n = 8$

$= \$13234.17$

(i) correct formula

(i) correct values for m, n, r .

(iii) $\$13234.17 \times (1.09)^{32} = \$208614.57 \quad (1)$

(iv)

Simon's invest will amount to $\$196844.38$ which is $\$11770.19$ less than Marcus'. Simon starts with $\$13234.17$ at beginning of the 32 year. Interest earned on this for one year is $\$14425$ - which is more than Simon contributes each year, Simon's interest will increase as the years go on, but so will Marcus', so Simon will not catch up.
 - NOT sure about allocation - need to discuss! (2 marks)

c)

length = circumference = $2\pi r$
 $r = 10 \text{ cm} \quad (1)$

length = $2 \times \pi \times 10 = 62.8 \text{ cm} \quad (1 \text{ nearest mm})$