

2013 Int 2 Paper 1

1. $6ab - 7bc$
 $b(6a - 7c)$

2. $m_{AB} = \frac{y_A - y_B}{x_A - x_B}$
 $= \frac{4 - 0}{0 - 3}$
 $= \frac{-4}{3}$

$$y - b = m(x - a)$$

$$y - 0 = \frac{-4}{3}(x - 3)$$

$$y = \frac{-4}{3}x + 4$$

3. $\text{Arc} = \frac{x}{360} \times 3.14 \times d.$
 $= \frac{72}{360} \times 3.14 \times 10$
 $= \frac{72}{36} \times 3.14$
 $= 2 \times 3.14$
 $= \underline{\underline{6.28 \text{ cm}}}$

4. $2x - y = 10 \times 5.$
 $4x + 5y = 6$

$$\begin{array}{r} 10x - 5y = 50 \\ * 4x + 5y = 6 \\ \hline 14x = 56 \\ x = \underline{\underline{4}} \end{array}$$

$$\begin{array}{r} 2(4) - y = 10 \\ -y = 10 - 8 \\ y = \underline{\underline{-2}} \end{array}$$

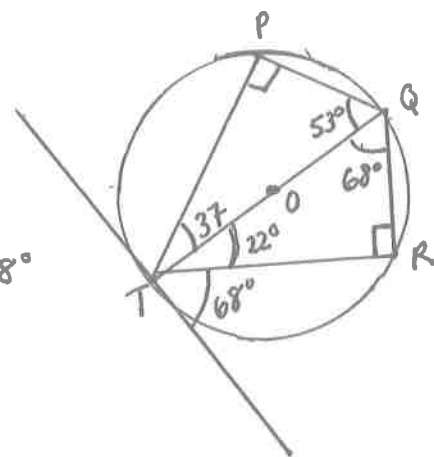
$$A = (0, 4)$$

$$B = (3, 0)$$

$$C = 4.$$

or \downarrow
 $y = \frac{-4}{3}x + 4.$

5.



$$\begin{aligned} \angle PQR &= 53^\circ + 68^\circ \\ &= \underline{\underline{121^\circ}} \end{aligned}$$

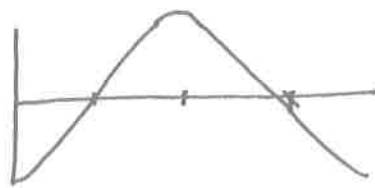
6. No longer in course.

$$\begin{aligned} 7. \frac{(x+4)^2}{x^2 - x - 20} \\ &= \frac{(x+4)^2}{(x-5)(x+4)} \\ &= \underline{\underline{\frac{x+4}{x-5}}} \end{aligned}$$

8. $y = \sin 2x$
2: twice in 360
 $= \underline{\underline{180^\circ}}$

9. $y = 20 - (x-4)^2$
 $T_p = (4, 20)$

10. $y = \sin(x - 90)^\circ$



$$y = \sin(x - 90)^\circ$$

2013 Int2 Paper 2

1. $(x+2)(x-5) - 9x$
 $= x^2 - 5x + 2x - 10 - 9x$
 $= x^2 - 3x - 9x - 10$
 $= \underline{\underline{x^2 - 12x - 10}}$

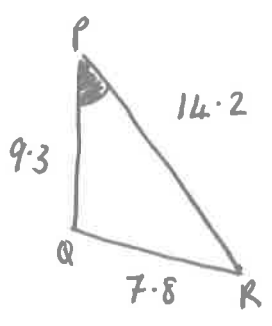
2. 1. $750000 \times 0.8 = 600000$
 2. $750000 \times 0.8^2 = 480000$
 3. $750000 \times 0.8^3 = 384000$
 4. $750000 \times 0.8^4 = 307200$

$\frac{1}{2}$ of 750k = 375000

Replacement due in year 4.

3. SNP = $0.35 \times 360 = 126^\circ$
 Lab = $0.3 \times 360 = 108^\circ$
 Libdem = $0.15 \times 360 = 54^\circ$
 Cons = $0.1 \times 360 = 36^\circ$
 Other = 36° .

4. $\cos P = \frac{q^2 + r^2 - p^2}{2qr}$
 $= \frac{14.2^2 + 9.3^2 - 7.8^2}{2(9.3)(14.2)}$
 $= 0.816...$



$P = \cos^{-1}(0.816...)$
 $P = 35.249...$
P = 35.2^\circ

5. $a = 1$
 $b = -5$
 $c = -2$
 $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

$x = \frac{5 \pm \sqrt{25 - 4(-2)(1)}}{2}$

$x = \frac{5 + \sqrt{33}}{2}$ $x = \frac{5 - \sqrt{33}}{2}$

$x = 5.372...$ $x = 0.372...$
x = 5.4 x = 0.4

6a) $\bar{x} = \frac{410}{5} = 82$

x	x - \bar{x}	(x - \bar{x}) ²
84	2	4
78	-4	16
87	5	25
80	-2	4
81	-1	1
		<u>50</u>

$S = \sqrt{\frac{\sum(x - \bar{x})^2}{n-1}}$
 $= \sqrt{\frac{50}{4}}$
 ~~$= 3.535...$~~
= 3.5

b) $\bar{x} = \frac{407 + 510}{5} = 102.$

x	x - \bar{x}	(x - \bar{x}) ²
104	2	4
98	-4	16
107	5	25
100	-2	4
101	-1	1

$S = \sqrt{\frac{50}{4}}$
 $= 3.53...$
= 3.54

7. $V_{\text{cube}} = 10^3$
 $= \underline{1000 \text{ cm}^3}$

$V \text{ after loss} = 1000 \times 0.92$
 $= \underline{920 \text{ cm}^3}$

$V_{\text{cone}} = \frac{1}{3} \pi r^2 h$

$920 = \frac{1}{3} \pi 8^2 \times h$

$h = \frac{3 \times 920}{8^2 \pi}$

$h = 13.727 \dots$

$h = 13.7 \text{ cm}$

$h = 13 \text{ cm (2st)}$

8. $a = 3b^2 + c$

$a - c = 3b^2$

$b^2 = \frac{a - c}{3}$

$b = \underline{\underline{\sqrt{\frac{a - c}{3}}}}$

9. $\frac{x^6}{y^2} \times \frac{y^3}{x^3}$

$= \frac{x^6 y^3}{x^3 y^2}$

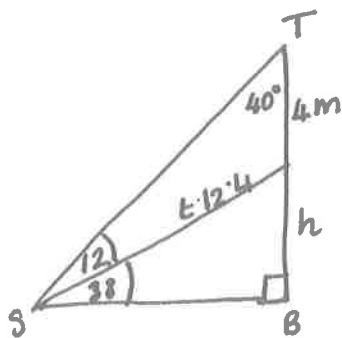
$= \underline{\underline{x^3 y}}$

10.

$\frac{t}{\sin 40} = \frac{4}{\sin 12}$

$t = \frac{4 \sin 40}{\sin 12}$

$= \underline{\underline{12.4 \text{ (1dp)}}}$



$\sin 38 = \frac{h}{12.4}$

$h = 12.4 \sin 38$

$= 7.634$

$\underline{\underline{CB = 7.6 \text{ m}}}$

11. $\frac{3}{x+2} + \frac{5}{x-1}$

$\frac{3(x-1) + 5(x+2)}{(x+2)(x-1)}$

$= \frac{3x - 3 + 5x + 10}{(x+2)(x-1)}$

$= \frac{8x + 7}{(x+2)(x-1)}$

12.

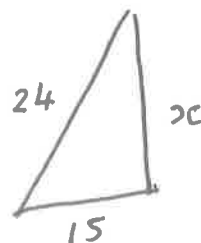
$x^2 = 24^2 - 15^2$

$= 351$

$x = \sqrt{351}$

$x = 18.734 \dots$

$x = 18.7 \text{ to 1 dp.}$



$PQ = 24 + 24 + 18.7 + 18.7$
 $= \underline{\underline{84.8 \text{ cm}}}$

13. $h = 7 + 5 \sin t$
 $10.8 = 7 + 5 \sin t$

$5 \sin t = 3.8$

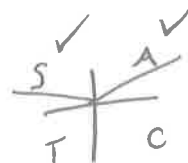
$\sin t = \frac{3.8}{5}$

$t = \sin^{-1} \left(\frac{3.8}{5} \right)$

$= 49.464 \dots$

$= 49.5^\circ, 180 - 49.5$

$= \underline{\underline{49.5^\circ, 130.5^\circ}}$



$\therefore \underline{\underline{49.5 \text{ seconds and } 130.5 \text{ seconds}}}$