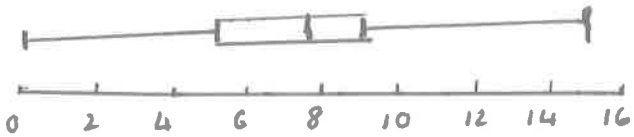


2011 Int 2 Paper 1

1a) 0 2 5 6 6 7 8 9 11 15

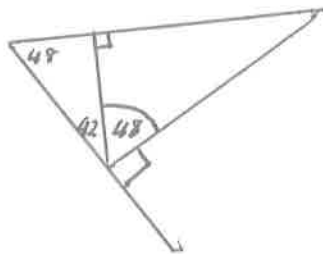
L = 0  
 Q<sub>1</sub> = 5  
 Q<sub>2</sub> = 6.5  
 Q<sub>3</sub> = 9  
 H = 15



b) • In general the train is late less.  
 • The spread of lateness is far less.

2)  $5x + (3x+2)(2x-7)$   
 $= 5x + 6x^2 - 21x + 4x - 14$   
 $= \underline{\underline{6x^2 - 12x - 14}}$

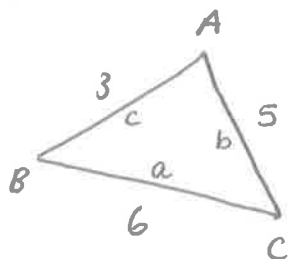
3)  $EPR = 90 + 48$   
 $= \underline{\underline{138^\circ}}$



4)  $2\sqrt{6}$ ,  $\sqrt{2} \times \sqrt{12}$ ,  $\sqrt{3} \sqrt{8}$ ,  $\sqrt{24}$   
 $= \sqrt{24}$ ,  $= 3\sqrt{4 \times 2}$ ,  $= \sqrt{4 \times 6}$   
 $= \sqrt{4 \times 6}$ ,  $= 6\sqrt{2}$ ,  $= \underline{\underline{2\sqrt{6}}}$   
 $= \underline{\underline{2\sqrt{6}}}$

∴  $3\sqrt{8}$  is different.

5)  $\cos B = \frac{a^2 + c^2 - b^2}{2ac}$   
 $= \frac{6^2 + 3^2 - 5^2}{2(6)(3)}$   
 $= \frac{20}{36}$   
 $= \frac{5}{9}$

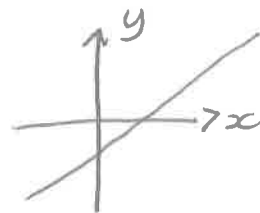


6)  $9^{\frac{3}{2}}$   
 $= \sqrt{9^3}$   
 $= 3^3$   
 $= \underline{\underline{27}}$

7) max/min = -5 → 5  
 ∴ a = 5.

graph occurs 4 times in 360  
 ∴ b = 4

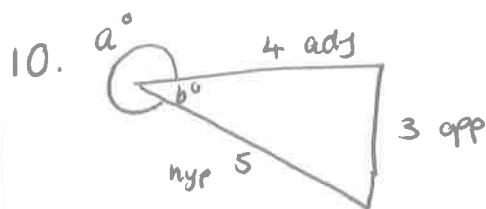
8) m > 0 positive gradient  
 c < 0 negative intercept



9a)  $x^2 - 4x - 21$   
 $(x-7)(x+3)$

b)  $(x-7)=0$   $(x+3)=0$   
 $x=7$   $x=\underline{\underline{-3}}$

c)  $x^2 - 4x - 21$   
 $(x-2)^2 - 25$   
 $TP = \underline{\underline{(4, -2)}}$   
 $\left. \begin{array}{l} (x-2)^2 \\ = x^2 - 4x + 4 \end{array} \right\}$



$\cos a^\circ = \cos b^\circ$

∴  $\cos a^\circ = \frac{4}{5}$

2011 Int2 Paper 2.

$$1. \frac{y_A - y_B}{x_A - x_B}$$

$$= \frac{5 - (-4)}{-3 - 7}$$

$$= \frac{9}{-10}$$

$$A(-3, 5)$$

$$B(7, -4)$$

$$2. 134750 \times 1.0315^3$$

$$= 147889.2038$$

$$= \underline{\underline{\pounds 147900 \text{ (4SF)}}}}$$

$$3. A = 4\pi r^2$$

$$\frac{A}{4\pi} = r^2$$

$$r = \sqrt{\frac{A}{4\pi}}$$

$$4a. V = \pi r^2 h$$

$$= \pi \times 1.5^2 \times 15$$

$$= 106.028 \dots$$

$$= \underline{\underline{106.0 \text{ m}^3}}$$

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

$$5.7 = \frac{1}{3} \times \pi \times 1.5^2 \times h$$

$$3 \times 5.7 = \pi \times 1.5^2 \times h$$

$$h = \frac{3 \times 5.7}{\pi \times 1.5^2}$$

$$h = 2.419 \dots$$

$$\underline{\underline{h = 2.4 \text{ m}}}$$

$$\text{Total height} = 15 + 2.4 \text{ m}$$

$$= 17.4 \text{ m.}$$

$$5. \text{Area sector} = \frac{x}{360} \times \pi \times r^2$$

$$= \frac{54}{360} \times \pi \times 7.3^2$$

$$= 25.112 \dots$$

$$= \underline{\underline{25.1 \text{ cm}^2}}$$

$$6a) \bar{x} = \frac{246}{6} = \underline{\underline{41}}$$

$x$	$x - \bar{x}$	$(x - \bar{x})^2$
43	2	4
39	-2	4
41	0	0
40	-1	1
39	-2	4
44	3	9
		<u>22</u>

$$s = \sqrt{\frac{\sum (x - \bar{x})^2}{n - 1}}$$

$$= \frac{22}{5}$$

$$= 2.097 \dots$$

$$= \underline{\underline{2.1}}$$

- b) Yes • mean of 41 lies within the tolerance limits of 38 and 42  
 • The standard deviation of 2.1 is less than 3.

$$7a) 24x + 6y = 60$$

$$b) 20x + 10y = 40$$

$$c) 120x + 30y = 300$$

$$- \quad 60x + 30y = 120 \quad -$$

$$60x = 180$$

$$x = 3$$

$$20(3) + 10y = 40$$

$$10y = -20$$

$$y = -2.$$

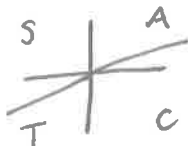
7c)  $Dand = 17x + 3 + (13x - 2)$   
 $= 51 - 26$   
 $= \underline{\underline{25}}$

8)  $\frac{3x - 15}{(x - 5)^2}$   
 $= \frac{3(x - 5)}{(x - 5)^2}$   
 $= \underline{\underline{\frac{3}{x - 5}}}$

9  $\frac{3}{x} - \frac{4}{x + 1}$   
 $= \frac{3(x + 1) - 4x}{x(x + 1)}$   
 $= \frac{3x + 3 - 4x}{x(x + 1)}$   
 $= \underline{\underline{\frac{3 - x}{x(x + 1)}}}$

10.  $2 \tan x - 3 = 5$   
 $2 \tan x = 8$   
 $\tan x = 4$

$x = \tan^{-1}(4) = 76^\circ, 180 + 76$   
 $= \underline{\underline{76^\circ, 256^\circ}}$



11.  $4x^2 - 7x + 1 = 0$   
 $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

$a = 4$   
 $b = -7$   
 $c = 1$

$= \frac{7 \pm \sqrt{49 - 4(4)(1)}}{8}$

$x = \frac{7 + \sqrt{33}}{8}$

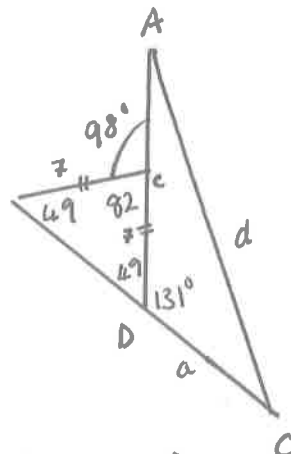
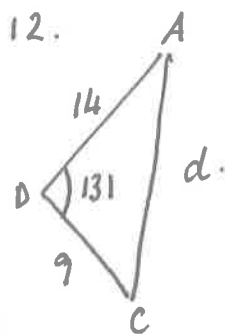
$x = \frac{7 - \sqrt{33}}{8}$

$x = 1.593...$

$x = 0.156...$

$\underline{\underline{x = 1.6}}$

$\underline{\underline{x = 0.2}}$

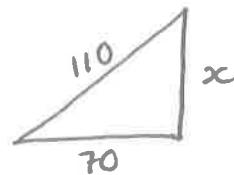


$d^2 = a^2 + c^2 - 2ac \cos D$   
 $= 9^2 + 14^2 - 2(9)(14) \cos 131$   
 $= 442.326...$

$d = \sqrt{442.326}$   
 $d = 21.031...$   
 $\underline{\underline{d = 21.0 \text{ cm}}}$

13.

$x^2 = 110^2 - 70^2$   
 $= 7200$   
 $x = \sqrt{7200}$   
 $= 84.852...$   
 $x = 84.9 \text{ mm}$   
 $d = 110 - 84.9$   
 $= \underline{\underline{25.1 \text{ mm}}}$



14.

$\frac{\sin^2 A}{1 - \sin^2 A}$   
 $= \frac{\sin^2 A}{\cos^2 A}$   
 $= \underline{\underline{\tan^2 A}}$

$\sin^2 A + \cos^2 A = 1$   
 $\cos^2 A = 1 - \sin^2 A$

$\frac{\sin A}{\cos A} = \tan A$