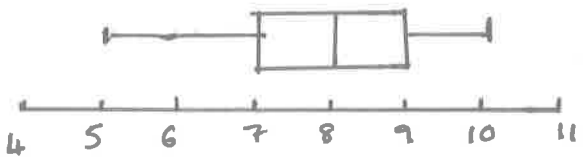
# 2012 Int 2 Paper 1

1. £ 1 158 000 000 000

2a.

| Cumulative Frequency |
|---|
| 2 |
| 7 |
| 13 |
| 24 |
| 33 |
| 35 |

b) $Q_1 = 7$ $Q_2 = 8$ $Q_3 = 9$




3a) $4x + 3y = 36$

$3y = -4x + 36$

$y = \frac{-4}{3}x + 12$ $\quad A = (0, 12)$

b) at (on) $y = 8$,

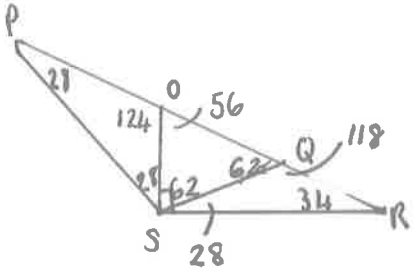
$4x + 24 = 36$

$4x = 12$

$x = 3$ $\quad C(3, 8)$

4)

$\angle QRS = 34°$.




5). Mean: $100800 \div 5 = 20160$

median: 10300

The mean is higher than 4 of the 5 values and so the median is more representative.

6a) $(x-2)(x-4) = 0$

$x = 2$ or $x = 4$.

b) On y axis, $x = 0$

$y = x^2 - 6x + 8$

$y = 0 - 6(0) + 8$

$y = 8$.

$A(0, 8)$, $B(2, 0)$, $C(4, 0)$.

c) $x^2 - 6x + 8$

$(x-3)^2 - 1$ $\qquad (x-3)^2$

$x^2 - 6x + 9$

TP: $(3, -1)$ $\qquad x = 3$

7. $A = \frac{1}{2}ab\sin C$

$20 = \frac{1}{2}(a)(16)(\frac{1}{4})$

$20 = \frac{16a}{8}$

$20 = 2a$

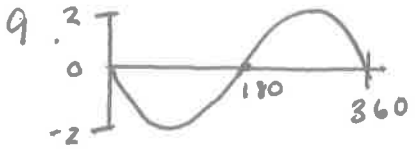
$a = 10$

8a) $(a+b)(a+b) = (a+b)^2$

b) $(94+6)(94+6) = 100^2$

$= 10000$

9.




10. $\sqrt{2}(\sqrt{3} + \sqrt{2}) - \sqrt{6}$

$= \sqrt{6} + \sqrt{4} - \sqrt{6}$

$= \sqrt{4}$

$= 2$

# 2012 Int 2 Paper 2.

1. Arc length $= \frac{110}{360} \times \pi \times d$.

$= \frac{110}{360} \times 40.8$

$= 12.466\ldots$

$= 12.5\text{cm}$

2. $(3x-5)(x^2+2x-6)$

$= 3x^3 + 6x^2 - 18x - 5x^2 - 10x + 30$

$= 3x^3 + x^2 - 28x + 30$.

3. $V_{sphere} = \frac{4}{3}\pi r^3$

$= \frac{4}{3}\pi 4^3$

$= 268.082\ldots$

$= 268.1\text{cm}^3$

$V_{cyl} = \pi r^2 h$

$= \pi \times 4^2 \times 15$

$= 753.982\ldots$

$= 754.0\text{cm}^3$

Total Volume $= 1022.1\text{cm}^3$

$= 1022\text{mm}$

4. $x = \frac{-b \pm \sqrt{b^2-4ac}}{2a}$ $\quad a=3,\ b=7,\ c=-5$.

$x = \frac{-7 \pm \sqrt{49-4(3)(-5)}}{2\times 3}$

$x = \frac{-7+\sqrt{109}}{6}$ $\qquad$ $x = \frac{-7-\sqrt{109}}{6}$

$x = 0.573\ldots$ $\qquad$ $x = -2.906\ldots$

$x = 0.6$ $\qquad$ $x = -2.9$

5a)

| $x$ | $x-\bar{x}$ | $(x-\bar{x})^2$ |
|---|---|---|
| 134 | 18 | 324 |
| 102 | -14 | 196 |
| 127 | 11 | 121 |
| 98 | -18 | 324 |
| 104 | -12 | 144 |
| 131 | 15 | 225 |
| | | 1334 |

$\bar{x} = \frac{696}{6} = 116$

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

$= \sqrt{\frac{1334}{5}}$

$= 16.334\ldots$

$= 16.3$

b) 1 and 4.

① The mean is the same and so the total scores are the same.

② Std deviation of second is lower so first matches are more spread out.

6a) $6x + 2y = 3148$

$5x + 3y = 3022$

$18x + 6y = 9444$

$-\ 10x + 6y = 6044$ $-$

$8x = 3400$

$x = 425$.

$5(425) + 3y = 3022$

$3y = 3022 - 2125$

$3y = 897$

$y = 299$

$2(425) + 4(299) = 2046$.

Over charged by £10.

# 2012 Int 2 Paper 2

7. $\frac{a}{b} + \frac{b}{a}$

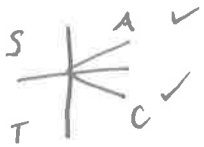
$= \frac{a^2}{ab} + \frac{b^2}{ab}$

$= \frac{a^2+b^2}{ab}$

8. $5\cos x - 3 = 1$

$5\cos x = 4$

$\cos x = 4/5$




$x = \cos^{-1}(4/5)$

$= 36.9°$ and $323.1°$

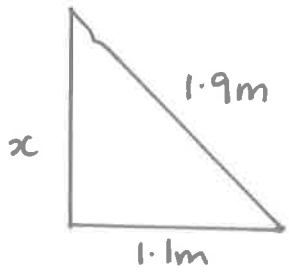
9. $E = \frac{I}{D^2}$

$D^2 E = I$

$D^2 = \frac{I}{E}$

$D = \sqrt{\frac{I}{E}}$

10.




$x^2 = 1.9^2 - 1.1^2$

$= 2.4$

$x = \sqrt{2.4}$

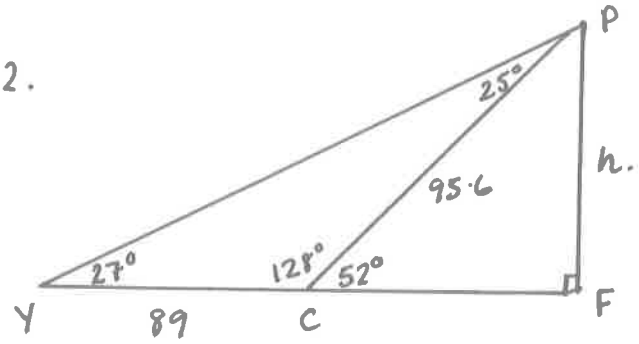
$x = 1.549....$

$x = 1.5m$

Depth $= 1.9 - 1.5 = 0.4m$.

11. $\frac{x^2 y^4}{x^{-3} y^6} = \frac{x^2 y^4 x^3}{y^6} = \frac{x^5}{y^2}$

12.




$\frac{c}{\sin C} = \frac{y?}{\sin Y} = \frac{p}{\sin P}$ ✓

$\frac{y}{\sin 27} = \frac{89}{\sin 25}$

$y = \frac{89 \sin 27}{\sin 25}$

$= 95.606...$

$= 95.6m$.

$\sin x = \frac{opp}{hyp}$

$\sin 52 = \frac{h}{95.6}$

$h = 95.6 \sin 52$

$= 75.333...$

$= 75.3m$

13. $0.85^4 = 0.522$

After 40 years, 52.2% remains and so

14. $\tan x = \frac{\sin x}{\cos x}$ ∴ $\frac{\cos x \tan x}{\sin x} = \frac{\cos x \sin x}{\sin x \cos x}$

$= 1$