

Intermediate 2 Units 1, 2, 3 Paper 1 2005

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Graduate Bsc (Hons) MathsSci (Open) GIMA

1. Given stem leaf diagram the probability that a child chosen at random is less than 130 cm is :

$$\frac{5}{18}$$

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12 1 2 4 5 9
13 0 0 1 5 7 8
14 0 2 8 9
15 1 1 2
    
```

$$n = 18$$

12|1 represents 121 cm

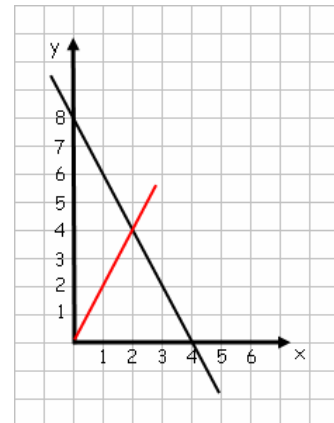
2. Given the diagram.

- (a) The equation of the black straight line is:

$$\text{Gradient is } \frac{y_2 - y_1}{x_2 - x_1} = \frac{0 - 8}{4 - 0} = \frac{-8}{4} = -2$$

$$c = y - \text{intercept} = 8$$

$$\text{Line has equation } y = -2x + 8$$



- (b) Plotting the line (red line of graph) the two lines meet at (2,4)

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3 (a) Given $(4x + 2)(x - 5) + 3x$

Multiplying out and gathering terms we have:

$$\begin{aligned}(4x + 2)(x - 5) + 3x \\ &= 4x(x - 5) + 2(x - 5) + 3x \\ &= 4x^2 - 20x + 2x - 10 + 3x \\ &= 4x^2 - 15x - 10\end{aligned}$$

(b) Using FOIL (or any other suitable method) to factorise the expression we get:

$$\begin{aligned}2p^2 - 5p - 12 \\ &= (2p - 3)(p + 4)\end{aligned}$$

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4. Given the volume data for the freezers.

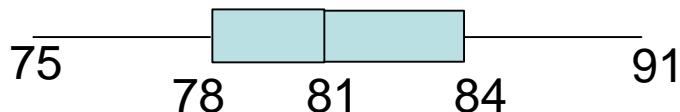
78 81 91 75 85 83 84 78

75 78 78 81 83 84 85 91

- (a) Calculating the median, lower and upper quartile we have:

$$\text{median} = \frac{81+83}{2} = 82 \quad \text{lower} = \frac{78+78}{2} = 78 \quad \text{upper} = \frac{84+85}{2} = 84.5$$

- (b) Given the box plot the number that is left out is:



The value that was omitted was 85 since upper quartile should be 84.5 and median should be 82 and the only way to get these false values can be correct is by omitting 85.

5. Simplifying we get: $k^8 \times (k^2)^{-3} = k^8 \times k^{-6} = k^2$

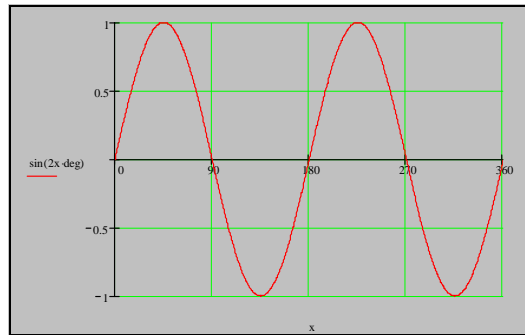
6. Given $\tan 45^\circ = 1$

Then $\tan 135^\circ = -\tan 45^\circ = -1$

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7. Sketching the graph of $y = \sin 2x^\circ$ in the range $0^\circ \leq x^\circ \leq 360^\circ$



8. (a) Given the diagram and the dimensions. The area is given by:



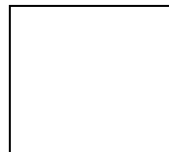
$$(x+2) \text{ cm}$$

$$\text{Area} = \text{length} \times \text{breadth}$$

$$\text{Area} = x(x+2)$$

$$\text{Area} = x^2 + 2x$$

- (b) Given the area of the square is bigger than the rectangle we have:



$$(x+1) \text{ cm}$$

$$(x+1)^2 - (x^2 + 2x)$$

$$= x^2 + 2x + 1 - (x^2 + 2x) = 1$$

Area is greater by 1cm

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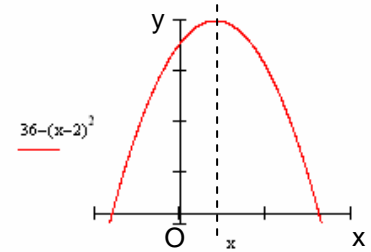
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9. Given the diagram of $y = 36 - (x - 2)^2$

(a) Coordinates of the maximum turning point is:

(b) The axis of symmetry is $(b, c) = (2, 36)$

The axis of symmetry is $x = 2$



S. Given the second diagram with $y = 20$ cutting $y = 36 - (x - 2)^2$ at R and S.

If S has coordinates $(6, 20)$ then the coordinates of R are given by:

Using the symmetry of the shape R has the coordinates:

$R = (-2, 20)$

