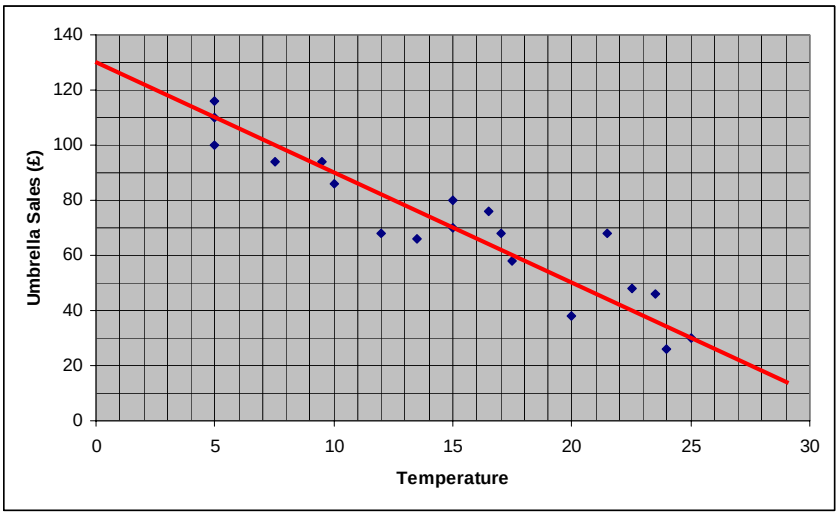
Intermediate 2 Units 1, 2, 3 Paper 1 2006

Created by
Graduate Bsc (Hons) MathsSci (Open) GIMA

1. Given the scatter graph of temperature against Umbrella sales.
The line of best fit has been added.



(a) The equation of the straight line is:

Gradient is $\frac{y_2 - y_1}{x_2 - x_1} = \frac{110 - 30}{5 - 25} = \frac{80}{-20} = -4$ c = y intercept = 130

Line has equation $S = -4T + 130$

(b) When temperature is 30°C the predicted sales will be:

$$S = -4 \times 30 + 130 = £10$$

2. (a) Given $(2y-3)(y^2+4y-1)$

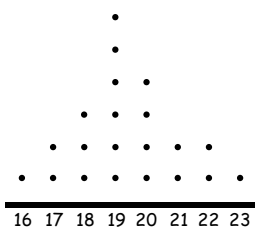
Multiplying out and gathering terms we have:

$$= 2y(y^2+4y-1)-3(y^2+4y-1)$$
$$= 2y^3+8y^2-2y-3y^2-12y+3$$
$$= 2y^3+5y^2-14y+3$$

3. Given the data on the number of absentees each day over 21 days.

19	22	19	22	20	21	17
19	21	16	20	19	18	18
20	20	23	19	18	17	19

(a) Constructing a dot plot we have:

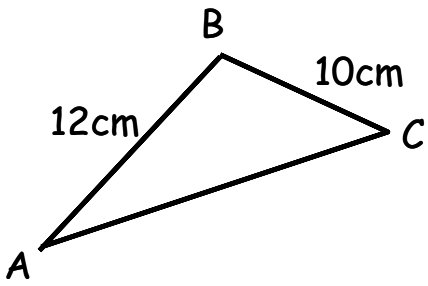


(b) Calculating the median, lower and upper quartiles we get:

$median = 19$ (11th value) $lower = \frac{18+18}{2} = 18$ $upper = \frac{20+21}{2} = 20.5$

(c) Probability that on a day more than 18 workers are off is: $\frac{15}{21} = \frac{5}{7}$

4. Given the diagram and that sinB = $\frac{2}{3}$.



The area is given by:

$$Area = \frac{1}{2}ac\sin B$$

$$= \frac{1}{2}\times 10\times 12\times \frac{2}{3} = 40cm^2$$

5. Given that a straight line is represented by 2y + x = 6

(a) To find the gradient, rearrange equation into the form y = mx+c

$$2y + x = 6$$

$$2y = 6 - x$$

$$y = 3 - \frac{1}{2}x$$

$$y = -\frac{1}{2}x + 3$$

Gradient is $-\frac{1}{2}$

(b) From part (a) we can write down were line crosses y-axis (0, 3)

6. Given the values: $\sin 0^\circ$ $\sin 30^\circ$ $\sin 200^\circ$

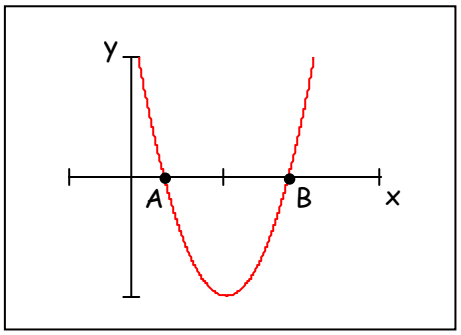
Putting the values in order, smallest first we have:

Sine increases in size between 0° and 90°.

Also $\sin 200^\circ = -\sin 20^\circ$

Hence we have: $-\sin 20^\circ$ $\sin 0^\circ$ $\sin 30^\circ$

7. Given the equation of the parabola is $y = (x - 3)^2 - 4$

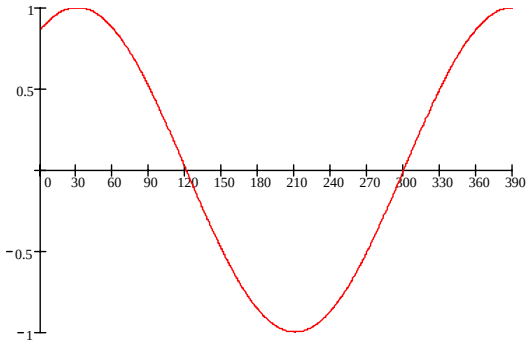


(a) Coordinates of minimum turning point are (b, c) = (3, -4).

(b) The axis of symmetry occurs at x = b therefore we have x = 3.

(c) Given A(1, 0). Then B by symmetry is (5, 0).

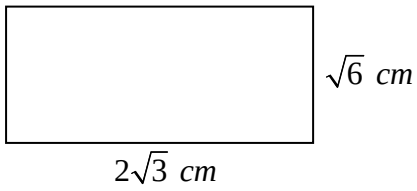
8. Given that the graph shown below has the form y = cos(x - a)°.



The value a = 30°

9. Evaluating $16^{\frac{3}{4}}$ we get: $\left(\sqrt[4]{16}\right)^3 = 2^3 = 2 \times 2 \times 2 = 8$

10. Given the diagram and the dimensions.
The area as a surd in its simplest form is given by:



Area = length x breadth

Area = $2\sqrt{3} \times \sqrt{6} = 2\sqrt{18} = 2\sqrt{9}\sqrt{2} = 6\sqrt{2}\ cm^2$

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