

Intermediate 2 Units 1, 2, 3 Paper 1 2007

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Graduate Bsc (Hons) MathsSci (Open) GIMA

1. Given the survey data for S1.

	Blazer	Non blazer
Boys	40	22
Girls	29	9

Probability that a girl is wearing a blazer is : $\frac{29}{100}$

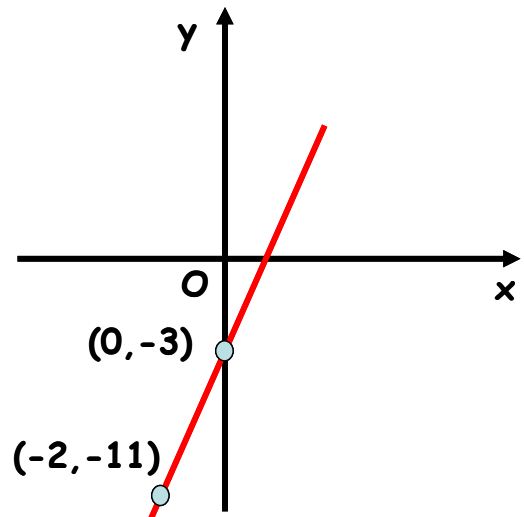
2. Given the diagram.

(a) The equation of the straight line is:

$$\text{Gradient is } \frac{y_2 - y_1}{x_2 - x_1} = \frac{-3 - (-11)}{0 - (-2)} = \frac{8}{2} = 4$$

c = y intercept = -3

Line has equation $y = 2x - 3$

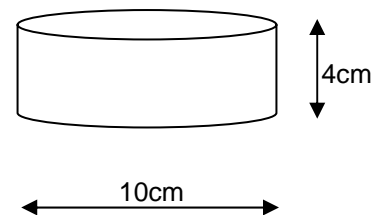


3. Calculating the volume of the cylinder we get:

$$V = \pi r^2 h$$

$$V = \pi \times (5)^2 \times 4$$

$$V = 314 \text{cm}^3$$



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4. Using simultaneous equations the intersection point for the 2 lines are:

$$x + 2y = -5 \quad \text{eqn 1}$$

$$3x - y = 13 \quad \text{eqn 2}$$

multiply eqn 2 by 2

$$x + 2y = -5 \quad \text{eqn 1}$$

$$6x - 2y = 26 \quad \text{eqn 3}$$

add eqn3 and eqn 1

$$7x = 21 \quad x = 3$$

sub in eqn 1 to find y

$$3 + 2y = -5 \quad y = -4$$

Remember you can check values by substituting them into any of the equations.

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Q5. Given $(x + 3)(x^2 + 4x - 12)$

Multiplying out and gathering like terms we have:

$$\begin{aligned} &= x(x^2 + 4x - 12) + 3(x^2 + 4x - 12) \\ &= x^3 + 4x^2 - 12x + 3x^2 + 12x - 36 \\ &= 4x^3 + 4x^2 - 36 \end{aligned}$$

Q6. The standard deviation is:

x	x^2
1	1
1	1
1	1
2	4
5	25
$\Sigma x = \underline{10}$	$\Sigma x^2 = \underline{32}$

$(\Sigma x)^2 = 100$

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

$$s = \sqrt{\frac{32 - 100/5}{4}}$$

$$s = \sqrt{\frac{12}{4}}$$

$$s = \sqrt{3}$$

(b) Standard deviation for 101, 101, 101, 102 and 105 is $\sqrt{3}$

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Q7. Given the diagram we have:

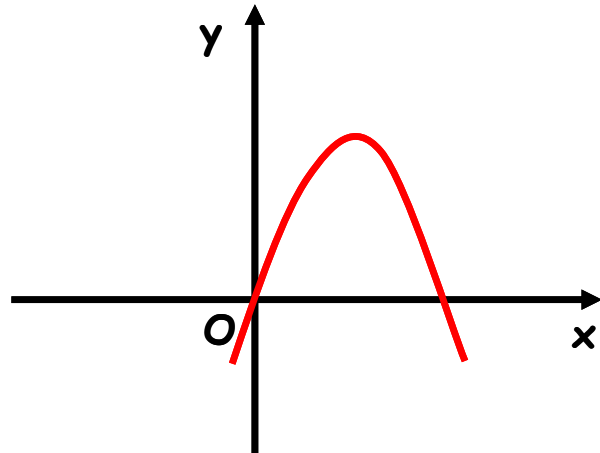
(a) Factorising we get:

$$8x - x^2 = 0$$

$$x(8 - x) = 0$$

$$x = 0 \text{ and } x - 8 = 0$$

Roots are $x = 0$ and $x = 8$



(b) The axis of symmetry is $x = 4$

(c) Turning point has coordinates

For $x = 4$

$$y = 8 \times 4 - 4^2$$

$$= 32 - 16 = 16$$

Coordinates are $(4, 16)$

Q8. Given that $\cos 60^\circ = 0.5$

The cosine function is negative in the third quadrant so:

$$\cos 240^\circ = -\cos(240 - 180)^\circ$$

$$= -\cos 60^\circ$$

$$= -0.5$$

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Q9. Given the right-angle triangle using Pythagoras we have:

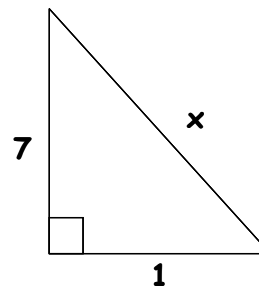
$$x^2 = 7^2 + 1^2$$

$$x^2 = 50$$

$$x = \sqrt{50}$$

$$x = \sqrt{25} \times \sqrt{2}$$

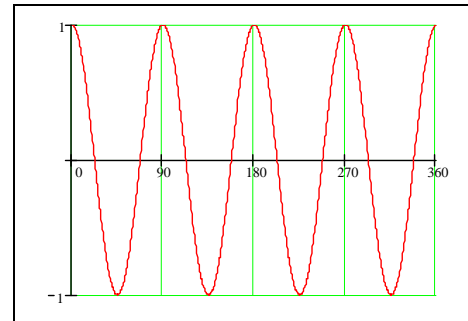
$$x = 5\sqrt{2}$$



Q10.

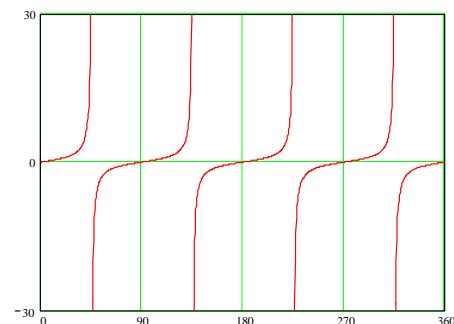
(a) Given the graph is of the form: $y = \cos ax^\circ$

$$a = 4$$



(b) Given the graph is of the form: $y = \tan bx^\circ$

$$b = 2$$



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Q11. Given a straight line is represented by the equation $y = ax + b$

A possible line graph represented by $a = 0$ and $b > 0$ is:

