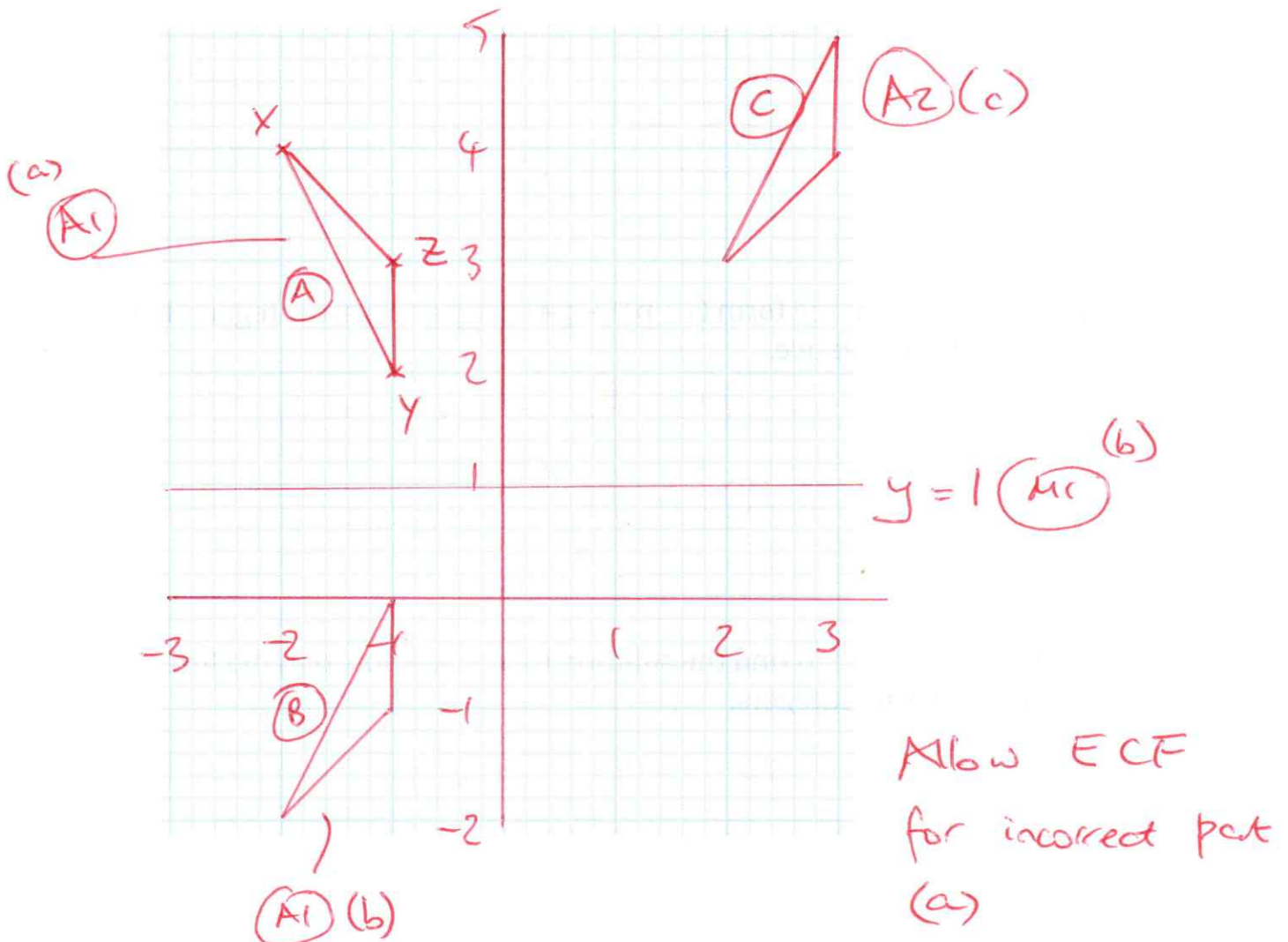




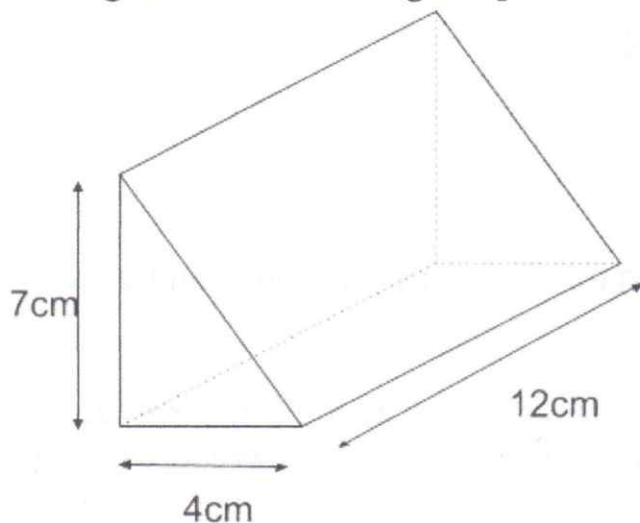
1. On the grid below, draw axes from -3 to 3 and -2 to 5 for the x - and y -axes respectively.

The points X, Y and Z have coordinates $(-2, 4)$, $(-1, 2)$ and $(-1, 3)$ respectively.

- Mark X, Y and Z on the diagram and join the points to create a triangle. Label this A. [1]
- Draw the line $y=1$ on your diagram.
Reflect triangle A in this line and label the new triangle B. [2]
- Translate triangle B using the vector $\begin{pmatrix} 4 \\ 5 \end{pmatrix}$. Label this new triangle C. [2]



2. The diagram shows a triangular prism.



Calculate the volume of the prism.

[3]

$$V = A \times L = \left(\frac{1}{2} \times 4 \times 7 \right) \times 12$$

$$= 14 \times 12$$

$$= \underline{168 \text{ cm}^3}$$

3 marks for correct ans

3.

- a. Express $x^2 - 8x + 10$ in the form $(x + p)^2 + q$ where p and q are integers that can be positive or negative.

[2]

$$(x-4)^2 - 16 + 10$$

$$= \underline{(x-4)^2 - 6}$$

- b. Use your answer to (a) to find the solution to $x^2 - 8x + 10 = 0$ in the form $a \pm \sqrt{b}$ where a and b are integers.

[2]

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

$$\Rightarrow (x-4)^2 = 6$$

$$\Rightarrow x-4 = \pm \sqrt{6}$$

$$\Rightarrow x = \underline{4 \pm \sqrt{6}}$$

must have \pm

4. Solve:

a. $2(x - 5) = 5x + 8$ [2]

$$2x - 10 = 5x + 8$$

$$-18 = 3x$$

$$x = -6$$

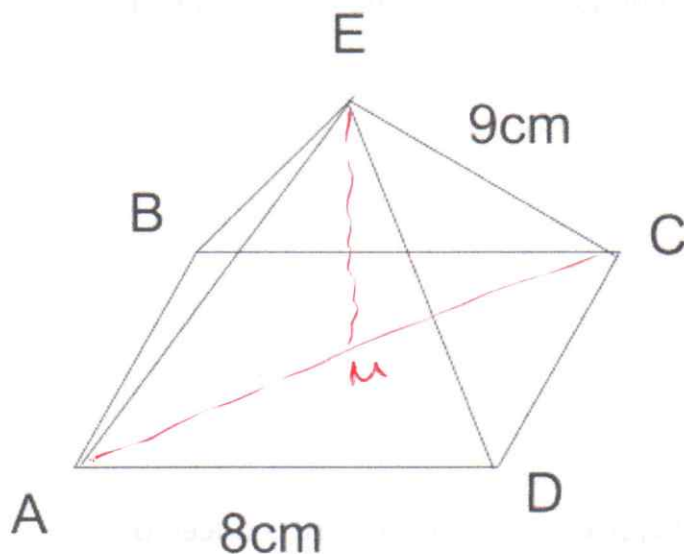
b. $\frac{2x+2}{4-x} = 6$ [2]

$$2x+2 = 6(4-x) = 24 - 6x$$

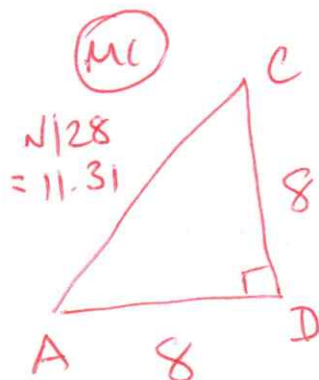
$$8x = 22$$

$$x = \frac{22}{8} = \frac{11}{4} = 2\frac{3}{4} = 2.75$$

5. ABCDE is a right square-based pyramid.



Calculate the size of angle AEC. Give your answer to 1dp. [4]



$$AM = \frac{1}{2} AC$$

$$= 5.66$$

$$\theta = \sin^{-1}\left(\frac{5.66}{9}\right) = 38.9^\circ$$

$$\angle AEC = 2\theta = 77.9^\circ$$

6. Points A and B have coordinates: A (x_1, y_1) (6, -3) and B (x_2, y_2) (-3, 3).

a. Find the gradient of line AB. [2]

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{3 - (-3)}{-3 - 6} = \frac{6}{-9} = -\frac{2}{3} \quad \text{(M1) (A1)}$$

b. Find the midpoint of AB. [2]

$$\begin{aligned} x & \quad 6 + (-3) = 3 \quad \div 2 = 1.5 \\ y & \quad -3 + 3 = 0 \quad \div 2 = 0 \end{aligned} \quad (1.5, 0) \quad \text{(A1)}$$

(M1) for any correct method

7. A teacher measures the heights of the students in his class. Each is measured to the nearest 1cm. The tallest is recorded at 164cm, and the shortest at 145cm. What is the largest possible difference in height between the tallest and shortest member of the class? [2]

$$\begin{aligned} \text{Tallest: upper bound} &= 164.5 \quad \text{(M1) for either} \\ \text{Shortest: lower bound} &= 144.5 \quad \text{correct} \\ \hline &20.0\text{cm} \quad \text{(A1)} \end{aligned}$$

8. In a sale at an electrical goods store, prices of all items are reduced by 12%.

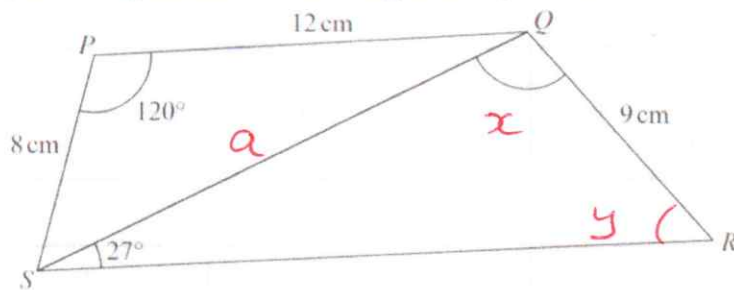
a. A vacuum cleaner is normally priced at £90. What is the sale price? [2]

$$90 \times 0.88 = \underline{\pounds 79.20} \quad \text{(M1) (A1)}$$

b. A dishwasher has a sale price of £259.60. What is its normal price? [2]

$$\frac{259.60}{0.88} = \underline{\pounds 295} \quad \text{(M1) (A1)}$$

9. PQRS is a quadrilateral. Angle SRQ is acute.



Work out the size of angle SQR. Give your answer to 1 decimal place.

[6]

$$a^2 = b^2 + c^2 - 2bc \cos A$$

$$= 12^2 + 8^2 - 2 \times 8 \times 12 \times \cos 120 \quad (\text{M1})$$

$$= 304$$

$$a = 17.44 \quad (\text{M1})$$

$$\frac{\sin y}{a} = \frac{\sin 27}{9} \quad (\text{M1}) \quad y = \sin^{-1} \left(17.44 \times \frac{\sin 27}{9} \right)$$

$$= \sin^{-1}(0.880)$$

$$y = 61.6^\circ \quad (\text{M1})$$

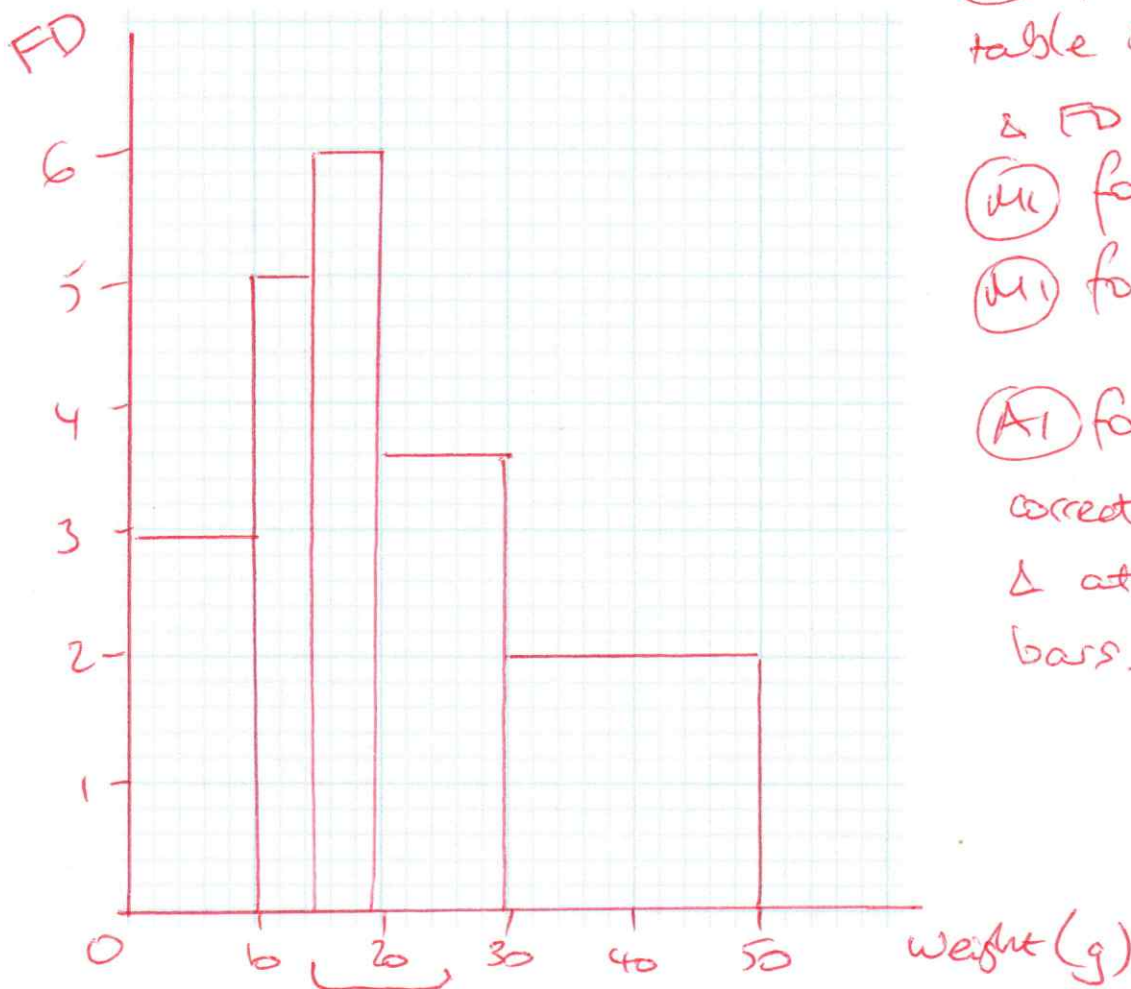
$$x = 180 - y - 27 = 180 - 61.6 - 27 \quad (\text{M1})$$

$$= 91.4^\circ \quad (\text{A1})$$

10. The weights of 160 apricots sampled from the harvest are as follows:

Weight (g)	Count	Class width	FD
$0 \leq w < 10$	29	10	2.9
$10 \leq w < 15$	25	5	5
$15 \leq w < 20$	30	5	6
$20 \leq w < 30$	36	10	3.6
$30 \leq w < 50$	40	20	2

a. Create a histogram to show the data in the table.



(MC) for table showing width & FD

[4]

(MC) for 4 correct width

(MC) for 2 correct FD

(A1) for graph showing correct axis labels & at least 2 correct bars.

b. Estimate the number of apricots that weight at least 15g but less than 25g.

[2]

$$15 - 20 = 30$$

$$20 - 25 = \frac{1}{2} \text{ of } 36 = 18$$

(MC)

$$15 - 25 = 18 + 30$$

$$= 48 \quad (A1)$$