1   A straight line → line 1

is perpendicular to the straight line through (2, 8) and (6, 15)

and

passes through (0, 9) and (x, 17)

Work out the value of x.

[4 marks]

gradient of line 2 : $\dfrac{15-8}{6-2} = \dfrac{7}{4}$ ①

gradient of line 1 : $(-1)\dfrac{1}{\frac{7}{4}} = -\dfrac{4}{7}$ ①

$\dfrac{17-9}{x} = -\dfrac{4}{7}$

$8(7) = -4x$

$56 = -4x$ ①

$x = -14$ ①

$x = $ _____ -14 _____

2   Points *P*, *Q* and *R* (8, 22) form a triangle.
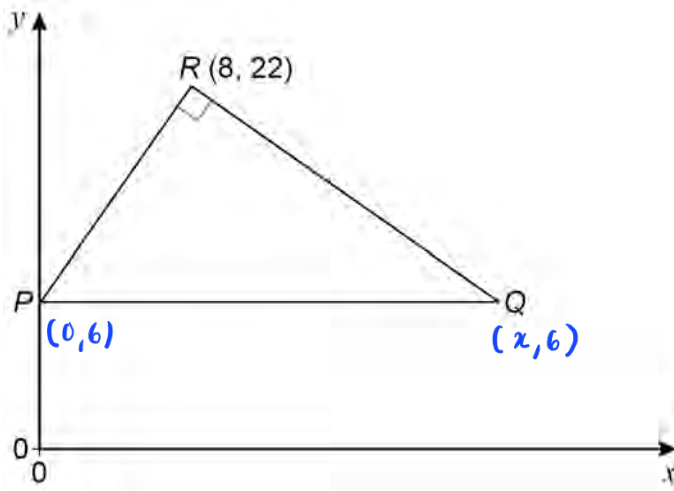
Not drawn
accurately

PQ is a horizontal line, with *P* on the *y*-axis.

Angle *PRQ* is a right angle.

The gradient of *PR* is 2

Work out the coordinates of *Q*.

[5 marks]

$$m_{PR} : 2 = \frac{22 - y}{8 - 0}$$

$$2(8) = 22 - y$$

$$y = 22 - 16$$

$$= 6 \; ①$$

$$m_{PR} \times m_{RQ} = -1$$

$$m_{RQ} = \frac{-1}{2} \; ①$$

$$-\frac{1}{2} = \frac{6 - 22}{x - 8} \; ①$$

$$-x + 8 = 12 - 44$$

$$-x = -40 \; ①$$

$$x = 40$$
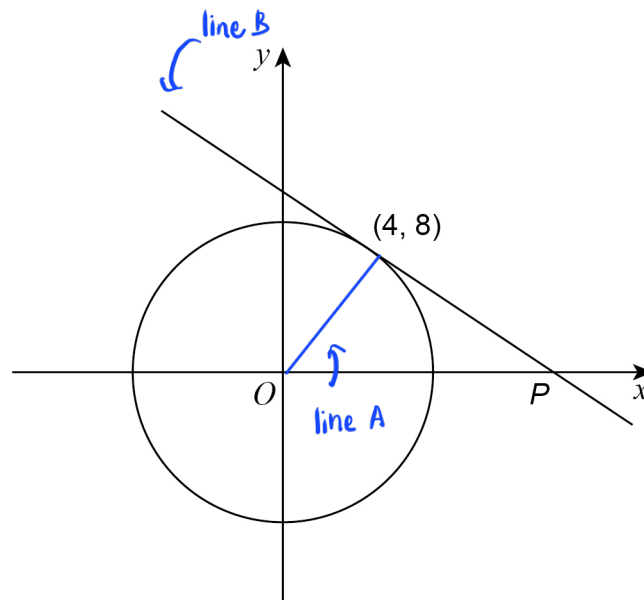
①

Answer (40   ,   6   )

3   (4, 8) is a point on a circle, centre O.

The tangent at (4, 8) intersects the x-axis at P.

line B

y

Not drawn
accurately

(4, 8)

O

line A

P x

Work out the x-coordinate of P.

[5 marks]

gradient of line A $= \dfrac{8-0}{4-0} = 2$ ①

gradient of line B $= \dfrac{-1}{2}$ ①

$-\dfrac{1}{2} = \dfrac{0-8}{p-4}$ ①

$-P+4 = -16$ ①

$-P = -20$
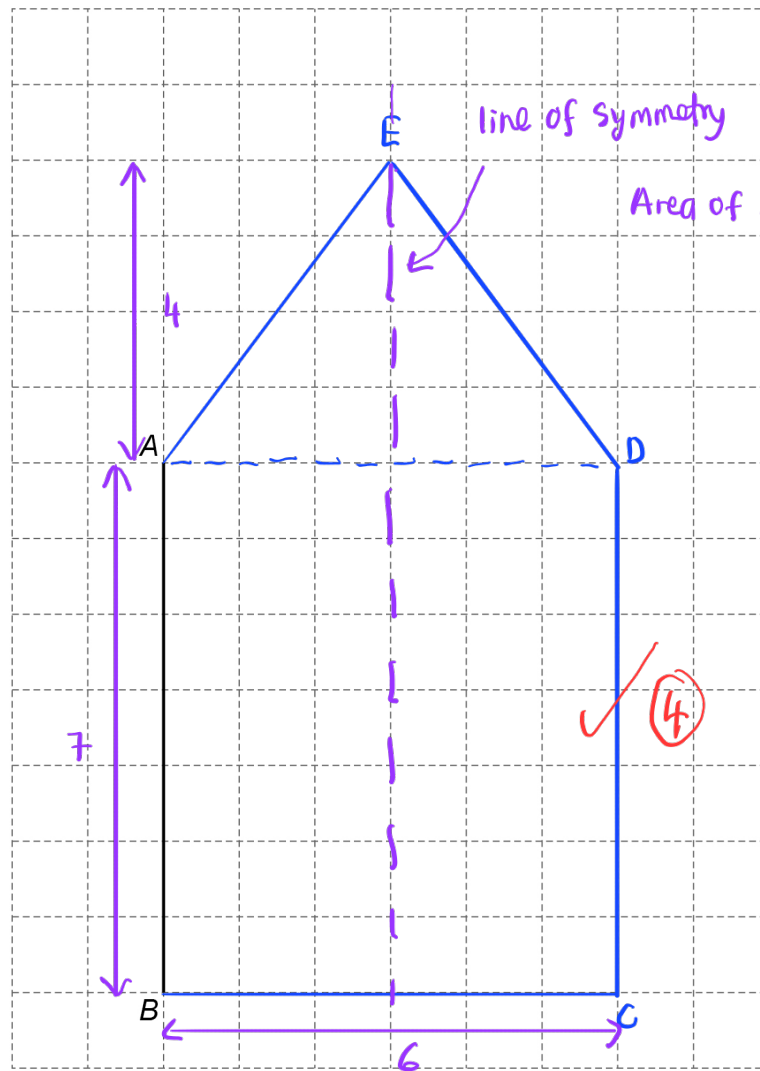
$P = 20$ ①

Answer _____ 20 _____

4   *ABCDE* is a pentagon with   *AB* = 7 cm

- *BC* = 6 cm

- *AB* and *BC* are perpendicular.

- *AB* and *DC* are equal **and** parallel.

- Area of the pentagon = 54 cm^2

- The pentagon has exactly **one** line of symmetry.

Complete a **labelled** drawing of the pentagon.

[4 marks]

line of symmetry

Area of ADE $= \frac{1}{2} \times 6 \times 4$

$= 12$ cm^2

Area of ABCD $= 7 \times 6 = 42$ cm^2

Area of ADE $= 54 - 42 = 12$ cm^2

5 (a)   Work out the equation of the line perpendicular to *AC* that passes through *C*.

[4 marks]

$$m\ AC = \frac{9-(-7)}{-5-3} = \frac{16}{-8} = -2 \quad \checkmark ①$$

$$\text{gradient perpendicular to } AC = -\frac{1}{(-2)}$$

$$= \frac{1}{2} \quad \checkmark ①$$

$$\text{At } C\ (3,-7) \quad ; \quad -7 = \frac{1}{2}(3) + c$$

$$-7 = 1.5 + c$$

$$c = -8.5 \quad \checkmark ①$$

$$y = \frac{1}{2}x - 8.5$$

Answer $\qquad y = \frac{1}{2}x - 8.5 \quad \checkmark ①$