

A Simultaneous Equations: Quadratic

- 21 The line $y = x + 1$ intersects the curve $y = x^2 + x - 3$ at two points.

Find the coordinates of the two points.

① = ②:

$$x^2 + x - 3 = x + 1$$

$-x \quad -1 \quad -x \quad -1$

$$x^2 - 4 = 0$$

$$(x + 2)(x - 2) = 0$$

$$\underline{x = -2} \text{ or } \underline{x = 2}$$

$\underline{x = 2} \rightarrow$ ①: $y = 2 + 1$
 $\underline{y = 3}$

$\underline{x = -2} \rightarrow$ ①: $y = -2 + 1$
 $\underline{y = -1}$

(.....2.....,3.....)

(.....-2.....,-1.....) [4]

- 18 Solve the simultaneous equations.
You must show all your working.

$$y = x^2 - 9x + 21 \quad (1)$$

$$y = 2x - 3 \quad (2)$$

$$(1) = (2):$$

$$x^2 - 9x + 21 = 2x - 3$$

$-2x + 3$ $-2x + 3$

$$x^2 - 11x + 24 = 0$$

$$(x - 8)(x - 3) = 0$$

$$\underline{x = 8} \quad \text{or} \quad \underline{x = 3}$$

$$\underline{x = 8} : \rightarrow (2):$$

$$y = 2(8) - 3$$
$$= 16 - 3$$

$$\underline{y = 13}$$

$$\underline{x = 3} : \rightarrow (2):$$

$$y = 2(3) - 3$$
$$= 6 - 3$$

$$\underline{y = 3}$$

$$x = \underline{8} \quad y = \underline{13}$$

$$x = \underline{3} \quad y = \underline{3} \quad [5]$$

- 27 The line $y = x + 1$ intersects the graph of $y = x^2 - 3x - 11$ at the points A and B .

Find the coordinates of A and the coordinates of B .
You must show all your working.

$$\textcircled{1} = \textcircled{2}:$$

$$x^2 - 3x - 11 = x + 1$$

$\begin{matrix} & -x & -1 \\ & -x & -1 \end{matrix}$

$$x^2 - 4x - 12 = 0$$

$$(x - 6)(x + 2) = 0$$

$$\underline{x = 6} \text{ or } \underline{x = -2}$$

$$\underline{x = 6:} \rightarrow \textcircled{1}:$$

$$y = 6 + 1$$

$$\underline{y = 7}$$

$$\underline{x = -2:} \rightarrow \textcircled{1}:$$

$$y = -2 + 1$$

$$\underline{y = -1}$$

$$A(\underline{6} , \underline{7})$$

$$B(\underline{-2} , \underline{-1}) [4]$$

(b)

$$y = 2 - x \quad \textcircled{1}$$

$$y = x^2 + 2x + 2 \quad \textcircled{2}$$

$$\textcircled{1} = \textcircled{2}:$$

$$x^2 + 2x + 2 = 2 - x$$

$+x \quad -2 \quad -2 + x$

$$x^2 + 3x = 0$$

$$x(x + 3) = 0$$

$$\underline{x = 0} \text{ or } \underline{x = -3}$$

$$\underline{x = 0} : \rightarrow \textcircled{1}:$$

$$y = 2 - 0$$

$$\underline{y = 2}$$

$$\underline{x = -3} : \rightarrow \textcircled{1}:$$

$$y = 2 - (-3)$$

$$\underline{y = 5}$$

$$x = \underline{0} \quad y = \underline{2}$$

$$x = \underline{-3} \quad y = \underline{5} \quad [4]$$

- 22 Solve the simultaneous equations.
You must show all your working.

$$y = x^2 - 3x - 13 \quad (1)$$

$$y = x - 1 \quad (2)$$

(1) = (2):

$$x^2 - 3x - 13 = x - 1$$

$-x \quad +1$ $-x \quad +1$

$$x^2 - 4x - 12 = 0$$

$$(x - 6)(x + 2) = 0$$

$$\underline{x = 6} \text{ or } \underline{x = -2}$$

$x = 6$: $\rightarrow$ (2):

$$y = 6 - 1$$

$$\underline{y = 5}$$

$x = -2$: $\rightarrow$ (2):

$$y = -2 - 1$$

$$\underline{y = -3}$$

$$x = \underline{6}, y = \underline{5}$$

$$x = \underline{-2}, y = \underline{-3} \quad [5]$$

- 24 The line $y = 7x + 3$ intersects the curve $y = x^2 + 5x - 12$ at the points A and B .

Find the coordinates of A and B .

$$\textcircled{1} = \textcircled{2}: \quad x^2 + 5x - 12 = 7x + 3$$

$-7x \quad -3 \qquad -7x \quad -3$

$$x^2 - 2x - 15 = 0$$

$$(x - 5)(x + 3) = 0$$

$$\underline{x = 5} \quad \text{or} \quad \underline{x = -3}$$

$$\underline{x = 5}: \rightarrow \textcircled{1}:$$

$$y = 7(5) + 3$$

$$= 35 + 3$$

$$\underline{y = 38}$$

$$\underline{x = -3}: \rightarrow \textcircled{1}:$$

$$y = 7(-3) + 3$$

$$= -21 + 3$$

$$\underline{y = -18}$$

$$A(\underline{5} , \underline{38})$$

$$B(\underline{-3} , \underline{-18})$$

[5]

- (b) The graphs of $y + 5x = 8$ and $y = 2x^2 + 6x - 13$ intersect at the points P and Q .

Find the coordinates of P and the coordinates of Q .
Show all your working.

$$\begin{array}{r} y + 5x = 8 \\ -5x \quad -5x \\ \hline y = 8 - 5x \quad (1) \end{array}$$

(1) = (2):

$$\begin{array}{r} 2x^2 + 6x - 13 = 8 - 5x \\ +5x \quad -8 \quad -8 + 5x \\ \hline 2x^2 + 11x - 21 = 0 \end{array}$$

$$ac = -42$$

two numbers: 14, -3

$$\rightarrow 2x^2 + 14x - 3x - 21 = 0$$

$$2x(x + 7) - 3(x + 7) = 0$$

$$(2x - 3)(x + 7) = 0$$

$$2x - 3 = 0 \quad \text{or} \quad x + 7 = 0$$

$$2x = 3 \quad \underline{x = -7}$$

$$\underline{x = \frac{3}{2}}$$

$$\underline{x = \frac{3}{2}} \rightarrow (1):$$

$$\begin{aligned} y &= 8 - 5\left(\frac{3}{2}\right) \\ &= 8 - \frac{15}{2} \end{aligned}$$

$$\underline{y = \frac{1}{2}}$$

$$\underline{x = -7} \rightarrow (1):$$

$$\begin{aligned} y &= 8 - 5(-7) \\ &= 8 + 35 \end{aligned}$$

$$\underline{y = 43}$$

$$P\left(\frac{3}{2}, \frac{1}{2}\right)$$

$$Q(-7, 43) \quad [6]$$

- 24 The straight line $y = 2x + 1$ intersects the curve $y = x^2 + 3x - 4$ at the points A and B.

Find the coordinates of A and B.

Give your answers correct to 2 decimal places.

$$\textcircled{1} = \textcircled{2}: \quad x^2 + 3x - 4 = 2x + 1$$

$\quad \quad -2x \quad -1 \quad \quad -2x \quad -1$

$$x^2 + x - 5 = 0$$

$$x = \frac{-1 \pm \sqrt{1^2 - 4(1)(-5)}}{2(1)}$$

$$x = \frac{-1 \pm \sqrt{21}}{2}$$

$$x = \underline{1.791...} \text{ ST0} \quad \text{or} \quad x = \underline{-2.791...} \text{ ST0}$$

$$x = \underline{1.791...} \rightarrow \textcircled{1}:$$

$$y = 2(1.791...) + 1$$

$$y = \underline{4.58}$$

$$A(\underline{1.79}, \underline{4.58})$$

$$B(\underline{-2.79}, \underline{-4.58})$$

[6]

$$x = \underline{-2.791...} \rightarrow \textcircled{1}:$$

$$y = 2(-2.791...) + 1$$

$$y = \underline{-4.58}$$

- 22 The line $y = 4x + 12$ intersects the curve $y = 2x^2 - x - 3$ at point P and point Q .

Find the coordinates of P and Q .

You must show all your working and give your answers correct to 2 decimal places.

① = ②:

$$2x^2 - x - 3 = 4x + 12$$

$$-4x - 12 \quad -4x - 12$$

$$2x^2 - 5x - 15 = 0$$

$$x = \frac{5 \pm \sqrt{(-5)^2 - 4(2)(-15)}}{2(2)}$$

$$= \frac{5 \pm \sqrt{25 + 120}}{4}$$

$$= \frac{5 \pm \sqrt{145}}{4}$$

$$x = 4.260... \text{ or } x = -1.760...$$

ST0

ST0

$$x = 4.260... \rightarrow \textcircled{1}:$$

$$y = 4(4.260...) + 12$$

$$y = 29.04$$

$$x = -1.760... \rightarrow \textcircled{1}:$$

$$y = 4(-1.760...) + 12$$

$$y = 4.96$$

$$(\underline{4.26}, \underline{29.04})$$

$$(\underline{-1.76}, \underline{4.96})$$

[6]

- 19 Find the values of x when $6x + y = 10$ and $y = x^2 - 3x + 10$.

$$6x + y = 10$$

$-6x$

$-6x$

$$y = 10 - 6x \quad (1)$$

$$(1) = (2):$$

$$x^2 - 3x + 10 = 10 - 6x$$

$+6x$

-10

$-10 + 6x$

$$x^2 + 3x = 0$$

$$x(x + 3) = 0$$

$$\underline{x = 0} \text{ or } \underline{x = -3}$$

$$\underline{x = 0: \rightarrow (1):}$$

$$y = 10 - 6(0)$$

$$= 10 - 0$$

$$\underline{y = 10}$$

$$\underline{x = -3: \rightarrow (1):}$$

$$y = 10 - 6(-3)$$

$$= 10 + 18$$

$$\underline{y = 28}$$

not
needed

$$x = \underline{0} \text{ or } x = \underline{-3} \quad [3]$$

- 19 Solve the simultaneous equations.
You must show all your working.

$$x - y = 7$$

$$x^2 + y = 149 \quad \textcircled{2}$$

$$x - y = 7$$

$$x = y + 7 \quad \textcircled{1}$$

Sub. ① into ②:

$$(y+7)^2 + y = 149$$

$$y^2 + 14y + 49 + y = 149$$

$$y^2 + 15y + 49 = 149$$

$$y^2 + 15y - 100 = 0$$

$$(y+20)(y-5) = 0$$

$$\underline{y = -20} \quad \text{or} \quad \underline{y = 5}$$

$$\underline{y = 5} : \rightarrow \textcircled{1} :$$

$$x = 5 + 7$$

$$\underline{x = 12}$$

$$\underline{y = -20} : \rightarrow \textcircled{1} :$$

$$x = -20 + 7$$

$$\underline{x = -13}$$

$$x = \dots 12 \dots \quad y = \dots 5 \dots$$

$$x = \dots -13 \dots \quad y = \dots -20 \dots \quad [5]$$

- 20 Solve the simultaneous equations.
You must show all your working.

$$\begin{aligned} 3x + y &= 11 \\ x^2 - 2y &= 18 \quad (2) \end{aligned}$$

$$\begin{aligned} 3x + y &= 11 \\ -3x & \quad -3x \\ \hline y &= 11 - 3x \quad (1) \end{aligned}$$

Sub. (1) into (2):

$$x^2 - 2(11 - 3x) = 18$$

$$x^2 - 22 + 6x = 18$$

$$x^2 + 6x - 22 = 18$$

$$x^2 + 6x - 40 = 0$$

$$(x + 10)(x - 4) = 0$$

$$\underline{x = -10} \text{ or } \underline{x = 4}$$

$$\rightarrow x = 4: \rightarrow (1):$$

$$\begin{aligned} y &= 11 - 3(4) \\ &= 11 - 12 \end{aligned}$$

$$\underline{y = -1}$$

$$\underline{x = -10}: \rightarrow (1):$$

$$\begin{aligned} y &= 11 - 3(-10) \\ &= 11 + 30 \end{aligned}$$

$$\underline{y = 41}$$

$$x = \underline{4} \quad y = \underline{-1}$$

$$x = \underline{-10} \quad y = \underline{41} \quad [5]$$

- (d) Solve the simultaneous equations.
You must show all your working.

$$\begin{aligned}x + 2y &= 12 \\ 5x + y^2 &= 39 \quad (2)\end{aligned}$$

$$\begin{array}{r}x + 2y = 12 \\ -2y \quad -2y \\ \hline x = 12 - 2y \quad (1)\end{array}$$

Sub. (1) into (2):

$$5(12 - 2y) + y^2 = 39$$

$$60 - 10y + y^2 = 39$$

$$y^2 - 10y + 60 = 39$$

$$y^2 - 10y + 21 = 0$$

$$(y - 7)(y - 3) = 0$$

$$\underline{y = 7} \text{ or } \underline{y = 3}$$

$$\underline{y = 3} \rightarrow (1):$$

$$x = 12 - 2(3)$$

$$= 12 - 6$$

$$\underline{x = 6}$$

$$\underline{y = 7} \rightarrow (1):$$

$$x = 12 - 2(7)$$

$$= 12 - 14$$

$$\underline{x = -2}$$

$$x = \dots 6 \dots y = \dots 3 \dots$$

$$x = \dots -2 \dots y = \dots 7 \dots [5]$$

- (b) Solve the simultaneous equations.
You must show all your working.

$$\begin{aligned}x^2 + 4y &= 37 \quad (1) \\ 5x + y &= -8\end{aligned}$$

$$\begin{array}{r}5x + y = -8 \\ -5x \quad -5x \\ \hline\end{array}$$

$$y = -8 - 5x \quad (2)$$

Sub. (2) into (1):

$$x^2 + 4(-8 - 5x) = 37$$

$$x^2 - 32 - 20x = 37$$

$$\begin{array}{r}x^2 - 20x - 32 = 37 \\ -37 \quad -37 \\ \hline\end{array}$$

$$x^2 - 20x - 69 = 0$$

$$(x - 23)(x + 3) = 0$$

$$\underline{x = 23} \quad \text{or} \quad \underline{x = -3}$$

$$\rightarrow \underline{x = 23} \rightarrow (2):$$

$$y = -8 - 5(23)$$

$$= -8 - 115$$

$$\underline{y = -123}$$

$$\underline{x = -3} \rightarrow (2):$$

$$y = -8 - 5(-3)$$

$$= -8 + 15$$

$$\underline{y = 7}$$

$$x = \underline{23}, y = \underline{-123}$$

$$x = \underline{-3}, y = \underline{7} \quad [5]$$

- 22 Find the coordinates of the point where the line $4x + y = 9$ intersects the curve $y + x^2 = 5$. (2)
You must show all your working.

$$4x + y = 9$$

$-4x$

$-4x$

$$y = 9 - 4x \quad (1)$$

Sub. (1) into (2):

$$9 - 4x + x^2 = 5$$

$$x^2 - 4x + 9 = 5$$

-5

-5

$$x^2 - 4x + 4 = 0$$

$$(x - 2)(x - 2) = 0$$

$$\underline{x = 2}$$

Sub. into (1):

$$y = 9 - 4(2)$$

$$= 9 - 8$$

$$\underline{y = 1}$$

(2, 1) [5]

- (ii) The graphs of $y = (x-1)^2$ and $y = \frac{1}{2}x + 1$ intersect at A and B.

Find the length of AB.

① = ②:

$$(x-1)^2 = \frac{1}{2}x + 1$$

$$(x-1)(x-1) = \frac{1}{2}x + 1$$

$$x^2 - 2x + 1 = \frac{1}{2}x + 1$$

$$x^2 - 2x = \frac{1}{2}x$$

$$2x^2 - 4x = x$$

$$2x^2 - 5x = 0$$

$$x(2x - 5) = 0$$

$$x = 0 \text{ or } 2x - 5 = 0$$

$$2x = 5$$

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

$x = 0 \rightarrow$ ②:

$$y = \frac{1}{2}(0) + 1$$

$$y = 1 \rightarrow (0, 1) \text{ A}$$

$x = \frac{5}{2} \rightarrow$ ②:

$$y = \frac{1}{2}\left(\frac{5}{2}\right) + 1$$

$$= \frac{5}{4} + 1$$

$$y = \frac{9}{4} \rightarrow \left(\frac{5}{2}, \frac{9}{4}\right) \text{ B}$$

Distance between A and B:

$$d = \sqrt{\left(\frac{5}{2} - 0\right)^2 + \left(\frac{9}{4} - 1\right)^2}$$

$$= \sqrt{\frac{25}{4} + \frac{25}{16}}$$

$$\frac{5\sqrt{5}}{4}$$

(or 2.80) [7]

$$= \frac{5\sqrt{5}}{4} \text{ or } 2.80$$

- 20 The curve $y = x^2 - 2x + 1$ is drawn on a grid.

A line is drawn on the same grid.

The points of intersection of the line and the curve are used to solve the equation $x^2 - 7x + 5 = 0$.

Find the equation of the line in the form $y = mx + c$.

Start with $y = x^2 - 7x + 5$, but $\div 0$:

$$x^2 - 7x + 5 = 0$$

Now add and subtract terms to make it the same as $x^2 - 2x + 1$:

$$x^2 - 7x + 5 = 0$$

$$-4 \quad -4$$

$$x^2 - 7x + 1 = -4$$

$$+5x \quad +5x$$

$$x^2 - 2x + 1 = 5x - 4$$

this is the line we need to draw

$$y = 5x - 4 \quad [1]$$

(c) Solve the simultaneous equations.

You must show all your working and give your answers correct to 2 decimal places.

$$2x + y = 7$$

$$y = 5x^2 + 2x - 13 \quad (2)$$

$$\begin{array}{r} 2x + y = 7 \\ -2x \quad -2x \end{array}$$

$$y = 7 - 2x \quad (1)$$

(1) = (2):

$$\begin{array}{r} 5x^2 + 2x - 13 = 7 - 2x \\ +2x \quad -7 \quad -7 + 2x \end{array}$$

$$5x^2 + 4x - 20 = 0$$

$$x = \frac{-4 \pm \sqrt{4^2 - 4(5)(-20)}}{2(5)}$$

$$= \frac{-4 \pm \sqrt{416}}{10}$$

$$\underline{x = 1.639...} \quad \text{or} \quad \underline{x = -2.439...}$$

STO STO

$$\underline{x = 1.639...} \rightarrow (1):$$

$$y = 7 - 2(1.639...)$$

$$\underline{y = 3.72}$$

$$\underline{x = -2.439...} \rightarrow (1):$$

$$y = 7 - 2(-2.439...)$$

$$\underline{y = 11.88}$$

$$x = 1.64, y = 3.72$$

$$x = -2.44, y = 11.88 \quad [6]$$

- 16 Solve the simultaneous equations.
You must show all your working.

$$x = 7 - 3y \quad \textcircled{1}$$
$$x^2 - y^2 = 39 \quad \textcircled{2}$$

Sub. $\textcircled{1}$ into $\textcircled{2}$:

$$(7 - 3y)^2 - y^2 = 39$$

$$(7 - 3y)(7 - 3y) - y^2 = 39$$

$$49 - 42y + 9y^2 - y^2 = 39$$

$$8y^2 - 42y + 49 = 39$$

$-39 \quad -39$

$$8y^2 - 42y + 10 = 0$$

$\div 2 \quad \div 2 \quad \div 2 \quad \div 2$

$$4y^2 - 21y + 5 = 0$$

ac = 20

two numbers: -20, -1

$$4y^2 - 20y - 1y + 5 = 0$$

$$4y(y - 5) - 1(y - 5) = 0$$

$$(4y - 1)(y - 5) = 0$$

$$4y - 1 = 0 \quad \text{or} \quad y - 5 = 0$$

$$4y = 1 \quad y = 5$$
$$y = \frac{1}{4}$$

$$y = \frac{1}{4} \rightarrow \textcircled{1}:$$

$$x = 7 - 3\left(\frac{1}{4}\right)$$

$$= 7 - \frac{3}{4}$$

$$x = \frac{25}{4}$$

$$y = 5 \rightarrow \textcircled{1}:$$

$$x = 7 - 3(5)$$

$$= 7 - 15$$

$$x = -8$$

$$\underline{x = \frac{25}{4}}, \underline{y = \frac{1}{4}}$$

$$\underline{x = -8}, \underline{y = 5}$$

[6]

- (c) Solve the simultaneous equations.
You must show all your working.

$$y = 4 - x \quad (1)$$

$$x^2 + 2y^2 = 67 \quad (2)$$

Sub. (1) into (2):

$$x^2 + 2(4-x)^2 = 67$$

$$x^2 + 2(4-x)(4-x) = 67$$

$$x^2 + 2(16 - 8x + x^2) = 67$$

$$x^2 + 32 - 16x + 2x^2 = 67$$

$$3x^2 - 16x + 32 = 67$$

$$\quad \quad \quad -67 \quad -67$$

$$3x^2 - 16x - 35 = 0$$

$$a = -105$$

two numbers: 5, -21

$$\rightarrow 3x^2 - 21x + 5x - 35 = 0$$

$$3x(x-7) + 5(x-7) = 0$$

$$(3x+5)(x-7) = 0$$

$$(3x+5)(x-7) = 0$$

$$3x+5=0 \text{ or } x-7=0$$

$$3x = -5 \quad \underline{x = 7}$$

$$\underline{x = -\frac{5}{3}}$$

$$\underline{x = 7 : \rightarrow (1):}$$

$$y = 4 - 7$$

$$\underline{y = -3}$$

$$\underline{x = -\frac{5}{3} : \rightarrow (1):}$$

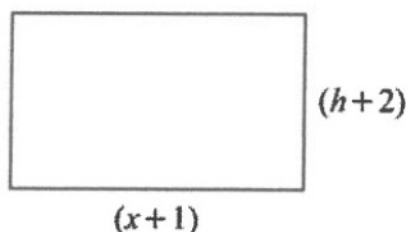
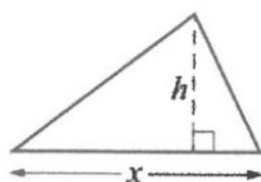
$$y = 4 - (-\frac{5}{3})$$

$$\underline{y = \frac{17}{3}}$$

$$x = \underline{7}, y = \underline{-3}$$

$$x = \underline{-\frac{5}{3}}, y = \underline{\frac{17}{3}} \quad [6]$$

21 In this question, all measurements are in centimetres.



NOT TO SCALE

The height of the triangle is h and the height of the rectangle is $(h+2)$.
The length of the base of the triangle is x and the length of the rectangle is $(x+1)$.
The area of the triangle is 11 cm^2 and the area of the rectangle is 39 cm^2 .

(a) Write down an expression, in terms of x , for the height of the rectangle.

Area of triangle = 11:

$$\frac{1}{2} \times x \times h = 11$$

$$xh = 22 \quad \rightarrow \quad h = \frac{22}{x}$$

sub. into $(h+2)$:

$$\frac{22}{x} + 2 \quad \dots\dots\dots \frac{22}{x} + 2 \quad [1]$$

(b) Show that $2x^2 - 15x + 22 = 0$.

Area of rectangle = 39:

$$(x+1)\left(\frac{22}{x} + 2\right) = 39$$

$$22 + 2x + \frac{22}{x} + 2 = 39$$

$$2x + 24 + \frac{22}{x} = 39$$

$$2x^2 + 24x + 22 = 39x$$

$$2x^2 - 15x + 22 = 0$$

[3]

(c) By factorising and solving $2x^2 - 15x + 22 = 0$, find the two possible heights of the triangle.

$$ac = 44$$

two numbers: $-4, -11$

$$\rightarrow 2x^2 - 4x - 11x + 22 = 0$$

$$2x(x-2) - 11(x-2) = 0$$

$$(2x-11)(x-2) = 0$$

$$2x-11=0 \quad \text{or} \quad x-2=0$$

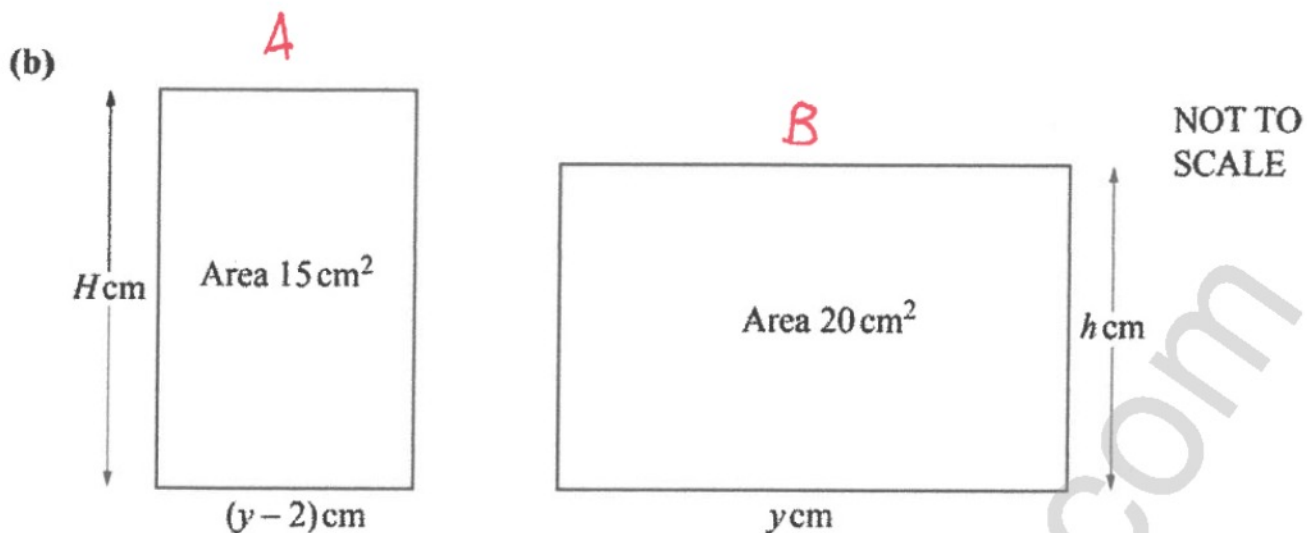
$$2x=11 \quad \quad \quad x=2$$

$$x=5.5$$

$$h = \frac{22}{x} : \quad h = \frac{22}{5.5} \quad \text{or} \quad h = \frac{22}{2}$$

$$h = 4 \quad \quad \quad h = 11$$

$$h = 4 \quad \text{or} \quad h = 11 \quad [5]$$



The diagram shows two rectangles where $H - h = 1$.

By forming a quadratic equation and factorising, find the value of y .

A: Area = $b \times h$
 $15 = H(y-2)$
 $\div (y-2) \quad \div (y-2)$
 $H = \frac{15}{y-2}$ ①

B: Area = $b \times h$
 $20 = hy$
 $\div y \quad \div y$
 $h = \frac{20}{y}$ ②

$H - h = 1$:

$$\frac{15}{y-2} - \frac{20}{y} = 1$$

$$\frac{15}{y-2} \times \frac{y}{y} - \frac{20}{y} \times \frac{(y-2)}{(y-2)} = 1$$

$$\frac{15y - 20(y-2)}{y(y-2)} = 1$$

$$\frac{15y - 20y + 40}{y(y-2)} = 1$$

$$\frac{-5y + 40}{y(y-2)} = 1 \quad \times y(y-2)$$

$$-5y + 40 = y(y-2)$$

$$-5y + 40 = y^2 - 2y$$

$$+5y \quad -40 \quad +5y \quad -40$$

$$y^2 + 3y - 40 = 0$$

$$(y+8)(y-5) = 0$$

$$y = -8 \quad y = 5$$

$\times$ can't be negative

$$y = 5 \quad [7]$$