

A55 (H)... Simultaneous Equations - Quadratics & Straight Lines

OCR

19 Solve these simultaneous equations algebraically.

A55

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

$$y = 4x - 1$$

$$x = \dots\dots\dots y = \dots\dots\dots$$

$$x = \dots\dots\dots y = \dots\dots\dots \mathbf{[6]}$$

19 Solve these simultaneous equations algebraically.

A55

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

$$y = 4x - 1$$



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

$$0 = 2x^2 - 7x - 4x + 1 + 4$$

$$0 = 2x^2 - 11x + 5$$

$$0 = (2x - 1)(x - 5)$$

$$2x - 1 = 0 \quad x = 5$$

$$2x = 1$$

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

$$0.5$$

$$\begin{array}{r} +5 \\ -5 \end{array} \quad \begin{array}{r} -1 \\ -1 \end{array}$$

$$y = 4x - 1$$

$$x = 5 \dots y = 4(5) - 1$$

$$y = 19$$

$$x = 0.5 \quad y = \frac{4(0.5) - 1}{2 - 1} = 1$$

$$\begin{array}{l} x = \dots 5 \dots y = \dots 19 \dots \\ x = \dots 0.5 \dots y = \dots 1 \dots \end{array} \quad \checkmark \quad [6]$$

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(b) Work out the coordinates of the intersection of the graphs of $y = 4x - 5$ and $y = x^2 - 17$.

ASSH

(b) (..... ,)

(..... ,) [6]

(b) Work out the coordinates of the intersection of the graphs of $y = 4x - 5$ and $y = x^2 - 17$.

ASSH

$$4x - 5 = x^2 - 17$$

$$0 = x^2 - 4x + 5 - 17$$

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

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

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

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

$$\begin{array}{l} -12 \\ -6 \quad +2 \end{array}$$

$$\begin{array}{l} x=6 \\ x=-2 \end{array} \left\{ \begin{array}{l} y = 4x - 5 \\ y = 24 - 5 \Rightarrow 19 \\ y = -8 - 5 \Rightarrow -13 \end{array} \right.$$

	x	y
(b) (6	19
(-2	-13

) [6]

Edexcel

20 Solve algebraically the simultaneous equations

A55

$$\begin{aligned}y &= 2x^2 - 3x - 10 \\ 2x - y &= -2\end{aligned}$$

.....
(Total for Question 20 is 5 marks)

20 Solve algebraically the simultaneous equations

A55

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

$$0 = 2x^2 - 3x - 2x - 10 - 2$$

$$0 = 2x^2 - 5x - 12$$

$$a = 2$$

$$b = -5$$

$$c = -12$$

$$4 \times 2x - 12$$

$$-96$$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$x = \frac{5 \pm \sqrt{25 - 96}}{4}$$

$$x = \frac{5 \pm \sqrt{121}}{4}$$

$$x = \frac{5 \pm 11}{4}$$

$$\frac{16}{4} = 4$$

$$\frac{-6}{4} = -1.5$$

$$y = 2x^2 - 3x - 10$$

$$2x - y = -2$$



$$2x - y = -2$$

$$-y = -2x - 2$$

$$y = 2x + 2$$

$$2x - y = -2$$

$$x = 4 \dots 8 - 10 = -2$$

$$y = 10$$

$$x = 4, y = 10$$

$$x = -1.5 \dots -3 - (-1) = -2$$

$$x = -1.5, y = -1$$

(Total for Question 20 is 5 marks)

AQA

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26

A curve has equation $y = 4x^2 + 5x + 3$

A55

A line has equation $y = x + 2$

Show that the curve and the line have **exactly** one point of intersection.

Do **not** use a graphical method.

[4 marks]

26

A55

A curve has equation $y = 4x^2 + 5x + 3$

A line has equation $y = x + 2$

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Show that the curve and the line have **exactly** one point of intersection.

Do **not** use a graphical method.

[4 marks]

$$x + 2 = 4x^2 + 5x + 3$$

$$0 = 4x^2 + 5x - x + 3 - 2$$

$$0 = 4x^2 + 4x + 1$$

$$\begin{array}{l} 4ac \\ 4 \times 4 \times 1 = 16 \end{array}$$

$$\begin{array}{l} a=4 \\ b=4 \\ c=1 \end{array}$$

$$4x^2 + 4x + 1 = 0$$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$x = \frac{-4 \pm \sqrt{16 - 16}}{8}$$

$$x = \frac{-4 \pm 0}{8} = -\frac{4}{8}$$

one solution
to has 1 point of int