



EXAM PAPERS PRACTICE

GCSE Edexcel Math
1MA1
Quadratic Formula

Answers

*"We will help you to
achieve A Star "*



Answer 1

Solve $3x^2 - 4x - 2 = 0$
Give your solutions correct to 3 significant figures.

$$x = \frac{4 \pm \sqrt{40}}{6}$$

$$x = \underline{1.72} \text{ or } \underline{-0.387}$$

not "and".

QUADRATIC FORMULA

$$ax^2 + bx + c = 0$$

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

$$a = 3$$

$$b = -4$$

$$c = -2$$

$$\begin{aligned} b^2 - 4ac &= 16 - 4 \times 3 \times -2 \\ &= 40 \end{aligned}$$



Answer 2

Solve the equation $3x^2 + 4x - 12 = 0$

Give your solutions correct to 2 decimal places.

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

$$x = \frac{-4 \pm \sqrt{160}}{6}$$

$$x = \underline{\underline{1.44}}$$

$$\text{or } x = \underline{\underline{-2.77}}$$

QUADRATIC FORMULA

$$ax^2 + bx + c = 0$$

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

$$a = 3$$

$$b = 4$$

$$c = -12$$

$$\begin{aligned} b^2 - 4ac &= 4^2 - 4 \times 3 \times (-12) \\ &= 160 \end{aligned}$$



Answer 3

Solve $3x^2 - x - 1 = 0$

Give your solutions correct to 2 decimal places.

↓
DOESN'T FACTORISE

$$x = \frac{1 \pm \sqrt{13}}{2 \times 3}$$

$$= 0.76759... \text{ or } -0.434258...$$

↓
≥ 5
↓
ROUND UP

$$= \underline{0.77}$$

OR $\underline{-0.43}$

↓
< 5
↓
LEAVE IT

QUADRATIC FORMULA

$$ax^2 + bx + c = 0$$

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

$$a = 3$$

$$b = -1$$

$$c = -1$$

$$\begin{aligned} b^2 - 4ac &= (-1)^2 - 4 \times 3 \times (-1) \\ &= 1 + 12 \\ &= 13 \end{aligned}$$



Answer 4

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

Give your solutions correct to 3 significant figures.

$$x = \frac{5 \pm \sqrt{13}}{2}$$
$$= 4.30277\dots$$

\swarrow
 $b < 5$
LEAVE ALONE

$$= 0.69722\dots$$

$$x = \underline{\underline{4.30}} \quad \text{or} \quad \underline{\underline{0.697}}$$

QUADRATIC FORMULA

$$ax^2 + bx + c = 0$$
$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$a = 1$$

$$b = -5$$

$$c = 3$$

$$(-5)^2 = 25$$

$$b^2 - 4ac = 25 - 4 \times 1 \times 3$$
$$= 25 - 12$$
$$= 13$$



Answer 5

Solve $3x^2 + 2x - 7 = 0$

Give your solutions correct to 3 significant figures.

Show your working clearly.

Quadratic formula

$$\frac{-b \pm \sqrt{b^2 - 4ac}}{2a} = x, \quad ax^2 + bx + c = 0$$

$$\frac{-(-2) \pm \sqrt{2^2 - 4(3)(-7)}}{2(3)}$$

$$\frac{-2 \pm \sqrt{4 + 84}}{6} = x$$

$$\frac{-2 \pm \sqrt{88}}{6} = x$$

$$x = 1.23, -1.90$$

$$x = 1.23, -1.90$$



Answer 6

Solve $3x^2 - 5x - 1 = 0$

Give your solutions correct to 3 significant figures.

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

$$= \frac{5 \pm \sqrt{37}}{6}$$

$$= \underline{\underline{1.85}} \quad \text{or} \quad \underline{\underline{-0.180}}$$

QUADRATIC FORMULA

$$ax^2 + bx + c = 0$$

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

$$a = 3$$

$$b = -5$$

$$c = -1$$

$$\begin{aligned} b^2 - 4ac &= (-5)^2 - 4 \times 3 \times (-1) \\ &= 37 \end{aligned}$$



Answer 7

Solve $3x^2 + 6x - 2 = 0$
Give your solutions correct to 2 decimal places.

$$x = \frac{-6 \pm \sqrt{60}}{6}$$

$$= 0.29099... \text{ or } -2.29099...$$

↓
↓
↓ < 5

$$= \underline{\underline{0.29}} \text{ or } = \underline{\underline{-2.29}}$$

QUADRATIC FORMULA

$$ax^2 + bx + c = 0$$

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

$$a = 3$$

$$b = 6$$

$$c = -2$$

$$b^2 - 4ac = 6^2 - 4 \times 3 \times (-2)$$

$$= 36 + 24$$

$$= 60$$



Answer 8

Solve $2x^2 + 3x - 7 = 0$
Give your solutions correct to 2 decimal places.

$$x = \frac{-3 \pm \sqrt{65}}{2 \times 2}$$

$$= 1.26556\dots$$

OR $-2.76556\dots$

1.27 OR -2.77 ROUNDUP

QUADRATIC FORMULA

$$ax^2 + bx + c = 0$$

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

$$a = 2$$

$$b = 3$$

$$c = -7$$

$$b^2 - 4ac = 9 - 4 \times 2 \times (-7) \\ = 65$$



Answer 9

The diagram shows a trapezium.

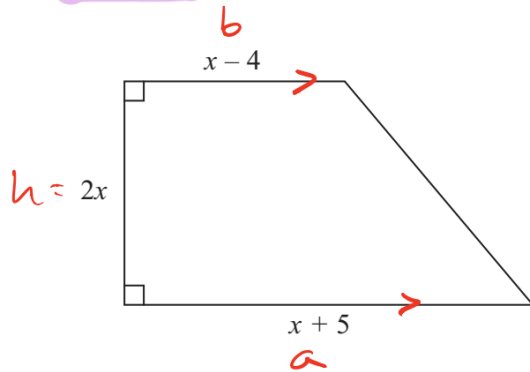


Diagram **NOT** accurately drawn

All the measurements are in centimetres.

The area of the trapezium is 351 cm^2 .

(a) Show that $2x^2 + x - 351 = 0$ ✓

$$A = \frac{1}{2}(a+b)h$$

$$351 = \frac{1}{2}(x+5 + x-4) \times 2x$$

$$351 = (2x+1)x$$

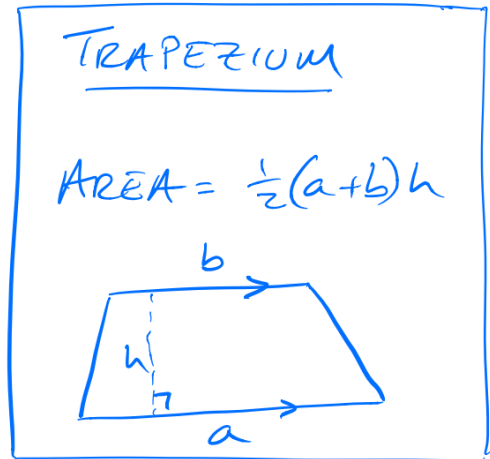
$$351 = 2x^2 + x$$

-351

-351



$$0 = 2x^2 + x - 351$$





Answer 10

Alison is using the quadratic formula to solve a quadratic equation.
She substitutes values into the formula and correctly gets

$$x = \frac{-7 \pm \sqrt{49 - 32}}{4}$$

Work out the quadratic equation that Alison is solving.

Give your answer in the form $ax^2 + bx + c = 0$, where a , b and c are integers.

$$-b = -7 \Rightarrow \underline{\underline{b = 7}}$$

$$2a = 4 \Rightarrow \underline{\underline{a = 2}}$$

$$-4ac = -32$$

$$-4 \times 2 \times c = -32$$

$$\frac{-8c}{-8} = \frac{-32}{-8}$$

$$\underline{\underline{c = 4}}$$

QUADRATIC FORMULA

$$ax^2 + bx + c = 0$$
$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$\underline{\underline{2x^2 + 7x + 4 = 0}}$$



Answer 11

(b) Solve $\frac{2}{y^2} + \frac{9}{y} - 7 = 0$

Give your solutions correct to 3 significant figures.

(from (a)) $x = \frac{1}{y}$ or $y = \frac{1}{x}$

OR MULTIPLY BY y^2

$$0 = \frac{2}{y^2} \times y^2 + \frac{9}{y} \times y^2 - 7 \times y^2$$
$$0 = 2 + 9y - 7y^2$$

USE QUADRATIC FORMULA

so $y = \frac{1}{0.676}$ or $\frac{1}{-5.18}$

1.48 or -0.193



Answer 12

(b) Solve $x^2 + 90x - 1200 = 0$

Find the value of x correct to 3 significant figures.

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

$$x = \frac{-90 \pm \sqrt{90^2 - (-1200)(1)(4)}}{2}$$

$$x = \frac{-45 \pm \sqrt{8100 + 4800}}{2}$$

positive root
= 11.789...

$$x = \underline{11.8}$$



Answer 13

(b) Solve $4x^2 + 9x - 47 = 0$

Show your working clearly.

Give your solutions correct to 3 significant figures.

Using the quadratic formula

$$\frac{-b \pm \sqrt{b^2 - 4ac}}{2a} = x, \text{ where } ax^2 + bx + c = 0$$

$$\frac{-9 \pm \sqrt{81 - 4(4)(-47)}}{2(4)} =$$

$$\frac{-9 \pm \sqrt{833}}{8} = 2.48 \text{ or } -4.73$$

2.48 or - 4.73
.....



Answer 14

(b) Work out the value of x .

$$2x^2 + x - 351 = 0$$

$$x = \frac{-1 \pm \sqrt{2809}}{2 \times 2}$$

$$x = 13 \quad \left(\text{OR } x = -\frac{27}{2} \right)$$



$x = 13$ (AS x MUST BE POSITIVE).

NO ACCURACY GIVEN SO IT DOES FACTORISE BUT WE WILL USE THE FORMULA
 $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$
(3)



Answer 15

(a) Solve $2x^2 + 9x - 7 = 0$

Give your solutions correct to 3 significant figures.

"CANNOT BE FACTORISED"

$$x = \frac{-9 \pm \sqrt{137}}{4}$$

$$x = \underline{\underline{0.676}} \text{ or } \underline{\underline{-5.18}}$$

QUADRATIC FORMULA

$$ax^2 + bx + c = 0$$

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

$$a = 2$$

$$b = 9$$

$$c = -7$$

$$b^2 - 4ac = 9^2 - 4 \times 2 \times (-7) \\ = 137$$