



Solving quadratics by factorisation

About 50 minutes No calculator 48 marks

Date _____

A Do Now

The first question is what today's lesson needs. The others bring back earlier topics.

- A1** Needed today [2 marks] **A2** Last lesson [2 marks]
- Factorise $49x^2 - 36y^2$.
- Find the coordinates of the turning point of $y = (x - 4)(x - 8)$.

Answer

Answer

- A3** From chapter 8 [2 marks] **A4** From chapter 16 [2 marks]
- Expand and simplify $(5x - 8)^2$.
- A code has 5 digits, each from 0 to 9. The first digit must be greater than 6 and the last digit must be less than 4. How many different codes are there?

Answer

Answer

B Example, then your turn

Your teacher works through each example with you. Then try the one beside it.

EXAMPLE 1

Solve $x^2 - x - 72 = 0$.**Hint** Find two numbers that multiply to -72 and add to -1 .

- B1** Solve $x^2 + 6x - 55 = 0$. [2 marks]

Answer $x = \dots\dots$ or $x = \dots\dots$

EXAMPLE 2

Solve $2x^2 + x - 21 = 0$.**Hint** Find two numbers that multiply to $2 \times (-21) = -42$ and add to 1. Use them to split the x term.

- B2** Solve $3x^2 + 7x - 6 = 0$. [3 marks]

Answer $x = \dots\dots$ or $x = \dots\dots$

C Practice

C1 Solve $(x + 4)(2x - 9) = 0$. [2 marks] **C2** Solve $3x^2 = 21x$. [2 marks]

Answer $x = \dots\dots$ or $x = \dots\dots$

Answer $x = \dots\dots$ or $x = \dots\dots$

C3 Solve $x^2 + 4x = 32$. [2 marks] **C4** Solve $9x^2 - 25 = 0$. [2 marks]

Answer $x = \dots\dots$ or $x = \dots\dots$

Answer $x = \dots\dots$ or $x = \dots\dots$

C5 Solve $(x + 10)(x - 1) = 60$. [3 marks] **C6** Solve $x + \frac{24}{x} = 10$. [3 marks]

Answer $x = \dots\dots$ or $x = \dots\dots$

Answer $x = \dots\dots$ or $x = \dots\dots$

C7 Solve $x^2 - 24x + 144 = 0$. How many different solutions are there? [2 marks] **C8** The solutions of $x^2 + bx + c = 0$ are $x = -12$ and $x = 5$. Work out b and c . [2 marks]

Answer $x = \dots\dots$, $\dots\dots$ solution(s)

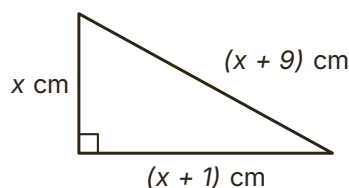
Answer $b = \dots\dots$ $c = \dots\dots$

D Exam-style questions

D1 Priya solves $2x^2 = 14x$. She divides both sides by $2x$ and writes, " $x = 7$." [2 marks]

Explain what is wrong with her method, and give the full solution.

D2 The diagram shows a right-angled triangle. All the lengths are in centimetres.



Not drawn accurately

(a) Show that $x^2 - 16x - 80 = 0$. [3 marks]

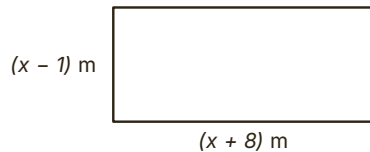
(b) Work out the perimeter of the triangle. You must show your working.

[3 marks]

Answer

Total for D2: 6 marks

D3 A rectangular garden is $(x + 8)$ m long and $(x - 1)$ m wide. Its area is 70 m^2 . The diagram is not drawn accurately.



(a) Show that $x^2 + 7x - 78 = 0$.

[2 marks]

(b) Work out the length and the width of the garden.

[3 marks]

Answer length m, width m

Total for D3: 5 marks

E Extension

No route is given. The hints are at the end of the sheet. Use one at a time.

E1 Two consecutive odd numbers multiply to give 323. Find the two possible pairs of numbers. [4 marks]

Answer and , or and

Extension hints

Cover these with paper. Uncover one at a time.

E1 Hint 1 Call the smaller number n . Then the larger one is $n + 2$.

Hint 2 $n(n + 2) = 323$, so $n^2 + 2n - 323 = 0$.

Hint 3 $(n + 19)(n - 17) = 0$, so $n = 17$ or $n = -19$. The pairs are 17, 19 and $-19, -17$.

How did it go?

Colour one circle on each line: not yet, nearly, yes.

I can solve a quadratic equation by factorising it.



I can rearrange an equation to equal zero before I factorise.



I can set up a quadratic from a shape and reject a solution that makes no sense.

