

The difference of two squares

Year 8 About 70 minutes No calculator 47 marks



Hints online, answers free with an account:
mathswariz.uk/worksheets/ks3-year-8-the-difference-of-two-squares/

Date _____

A Do Now

Quick questions to start.

- A1** Last lesson [1 mark] **A2** Needed today [1 mark]
 Factorise $x^2 - 7x - 78$. Work out 17^2 .

Answer

Answer

- A3** Lesson 1 [1 mark] **A4** Earlier [1 mark]
 Expand and simplify Factorise $6x^2 - 9x$ fully.
 $(3x + 2)(3x - 2)$.

Answer

Answer

B Example, then your turn

Year 8

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

EXAMPLE 1Factorise $x^2 - 289$.

Hint There is no x term, so you want two numbers that add to 0 and multiply to -289 . 289 is a square number.

- B1**
- Factorise
- $x^2 - 441$
- . [2 marks]

Answer

EXAMPLE 2Factorise $49a^2 - b^2$.

Hint $a^2 - b^2 = (a + b)(a - b)$ works for any two squares. Write $49a^2$ as a square.

- B2**
- Factorise
- $p^2 - 36q^2$
- . [2 marks]

Answer

EXAMPLE 3Factorise $4x^2 - 81$.

Hint Both terms are squares: $4x^2 = (2x)^2$ and $81 = 9^2$.

- B3**
- Factorise
- $25x^2 - 36$
- . [2 marks]

Answer

EXAMPLE 4Factorise fully $3x^2 - 147$.**Hint** 147 is not a square number. Take out the common factor 3 first.**B4** Factorise fully $2x^2 - 288$. [3 marks]

Answer

EXAMPLE 5Work out $47^2 - 43^2$ without a calculator.**Hint** $a^2 - b^2 = (a + b)(a - b)$. Use $a = 47$ and $b = 43$.**B5** Work out $8.6^2 - 1.4^2$ without a calculator. [2 marks]

Answer

c Practice

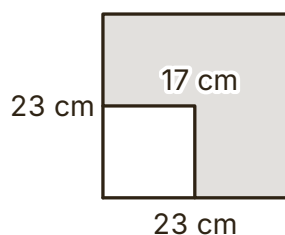
Year 8

C1 Factorise $y^2 - 324$. [2 marks]

Answer

C2 Fill in the missing numbers: [2 marks]
 $\square x^2 - 121 = (2x + \square)(2x - 11)$.

Answer and

C3 A square of side 17 cm is cut from a square of side 23 cm. Work out the area of the shaded part without a calculator. [2 marks]

Not drawn accurately

C4 Two of these can be factorised as the difference of two squares. Which two? Factorise them. [2 marks]

A: $x^2 + 400$

B: $9x^2 - 1$

C: $x^2 - 30x$

D: $64 - x^2$

Answer and

Answer cm^2 **C5** Simplify $\frac{x^2 - 576}{x - 24}$. [2 marks]

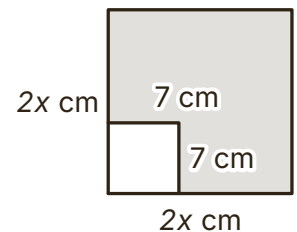
Answer

- D1** Ana says: " $36x^2 - 25 = (36x + 25)(36x - 25)$." [3 marks]
 Ana is wrong. Explain why, and factorise $36x^2 - 25$ correctly.

Answer $36x^2 - 25 = \dots\dots$

- D2** A square of side 7 cm is cut from a square of side $2x$ cm.

- (a) Show that the area of the shaded part is [2 marks]
 $(2x + 7)(2x - 7) \text{ cm}^2$.



Answer

Not drawn accurately

- (b) Use your answer to part (a) to work out the shaded [2 marks]
 area when $x = 10$.

Answer cm^2

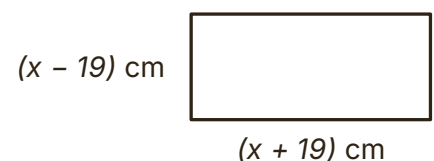
Total for D2: 4 marks

- D3** n is a whole number. Show that $(n + 5)^2 - (n - 5)^2$ is always a multiple of 20. [4 marks]

Answer

- D4** The rectangle is $(x + 19)$ cm long and $(x - 19)$ cm wide. A square has sides of x cm.

- (a) Show that the area of the square is 361 [2 marks]
 cm^2 more than the area of the rectangle.



Not drawn accurately

Answer

(b) The area of the rectangle is 264 cm^2 . Work out the value of x .

[3 marks]

Answer

Total for D4: 5 marks

D5 Factorise fully $48x^2 - 75$.

[3 marks]

Answer

E Extension

Stretch

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

E1 a and b are whole numbers with $a > b > 0$, and $a^2 - b^2 = 91$. Find both possible pairs of values of a and b . [3 marks]

Answer $a = \dots$, $b = \dots$ and $a = \dots$, $b = \dots$

Extension hints

Cover these with paper. Uncover one at a time.

- E1 **Hint 1** Factorise $a^2 - b^2$.
- Hint 2** $(a + b)(a - b) = 91$. Write 91 as a product of two whole numbers in every way you can.
- Hint 3** For each way, $a + b$ is the bigger number and $a - b$ the smaller. Solve for a and b .

How did it go?

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

I can factorise $x^2 - a^2$ as $(x + a)(x - a)$. ☐ ☐ ☐

I can spot a square such as $25x^2 = (5x)^2$ inside a difference of two squares. ☐ ☐ ☐

I can take out a common factor first and then factorise fully. ☐ ☐ ☐

I can use the difference of two squares to work out areas and calculations. ☐ ☐ ☐