



Algebraic fractions

About 50 minutes No calculator 46 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** From chapter 18 [2 marks]Factorise fully $6w^2 - 486$.

Answer

Of 60 values, 9 are at most 10, 25 are at most 20, 50 are at most 30 and all are at most 40 (none are below 0). Estimate the median, assuming the values in each class are spread evenly.

Answer

A3 From chapter 7 [2 marks] **A4** From chapter 14 [2 marks]

A rectangular garden is 16 m by 12 m. A tree is planted at the point that is the same distance from all four corners. How far is the tree from each corner?

Answer

Work out $(4.7 \times 10^{-4}) \times (3 \times 10^8)$. Give your answer in standard form.

Answer

B Example, then your turn

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

EXAMPLE 1Simplify fully $\frac{x^2 - 4x - 21}{x^2 - 49}$.**Hint** Factorise the top and the bottom. Cancel a whole bracket, never a single term.**B1** Simplify fully $\frac{x^2 + x - 12}{x^2 - 9}$. [3 marks]

Answer

EXAMPLE 2

Write $\frac{5}{x+2} + \frac{3}{x-4}$ as a single fraction.

Hint Use $(x+2)(x-4)$ as the denominator. Put a bracket round every new top.

B2 Write $\frac{4}{x-1} - \frac{3}{x+5}$ as a single fraction in its simplest form. [3 marks]

Answer

C Practice

C1 Simplify fully $\frac{6x+18}{x^2+3x}$. [2 marks]

Answer

C3 Simplify fully $\frac{3x^2-10x-8}{x^2-16}$. [3 marks]

Answer

C5 Write $\frac{x+1}{3} + \frac{2x-1}{4}$ as a single fraction. [2 marks]

Answer

C7 Simplify fully $\frac{x+1}{x^2-9} \div \frac{2x+2}{x-3}$. [2 marks]

Answer

C2 Simplify fully $\frac{10-5x}{x^2-4}$. [2 marks]

Answer

C4 Simplify fully $\frac{x^2-4y^2}{x^2+2xy}$. [2 marks]

Answer

C6 Simplify fully $\frac{x^2-4}{3x} \times \frac{6x^2}{x+2}$. [2 marks]

Answer

C8 Solve $\frac{x+3}{2} - \frac{x-1}{5} = 2$. [2 marks]

Answer

D Exam-style questions

D1 Zara says, " $\frac{2}{x} + \frac{3}{x+1} = \frac{5}{2x+1}$ ", because you add the tops and add the bottoms." [2 marks]

Show that Zara is wrong.

D2 Kim cycles 30 km at an average speed of x km/h. She then cycles 12 km uphill at an average speed of $(x - 3)$ km/h. The whole ride takes 3 hours.

(a) Show that $x^2 - 17x + 30 = 0$ [3 marks]

(b) Solve $x^2 - 17x + 30 = 0$ to find Kim's speed on the first part of the ride. Give a reason why you reject the other solution. [3 marks]

Answer km/h

Total for D2: 6 marks

D3 $\frac{3}{x+2} + \frac{a}{x-1}$ can be written as $\frac{5x+1}{(x+2)(x-1)}$, where a is a whole number. Work out the value of a . [3 marks]

Answer $a = \dots\dots$

E Extension

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

E1 Write $\frac{2x+1}{x^2+x-6} - \frac{1}{x-2}$ as a single fraction in its simplest form. [4 marks]

Answer

Extension hints

Cover these with paper. Uncover one at a time.

- E1** **Hint 1** Factorise $x^2 + x - 6$ first.
Hint 2 $(x - 2)(x + 3)$ is already a common denominator.
Hint 3 The top is $2x + 1 - (x + 3) = x - 2$.

How did it go?

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

- I can simplify an algebraic fraction by factorising and cancelling. ☐ ☐ ☐
- I can multiply, divide, add and subtract algebraic fractions. ☐ ☐ ☐
- I can solve an equation with algebraic fractions in it. ☐ ☐ ☐