Simplifying algebraic fractions

ANSWERS

1

Simplify fully $\dfrac{x^2 + 8x + 15}{x + 5}$

$= \dfrac{(x+3)\cancel{(x+5)}}{\cancel{(x+5)}}$

Answer $x + 3$

2

Simplify fully $\dfrac{x^2 + 2x - 8}{x - 2}$

$= \dfrac{(x+4)\cancel{(x-2)}}{\cancel{(x-2)}}$

Answer $x + 4$

3

Simplify fully $\dfrac{x^2 + 6x + 8}{x^2 + 7x + 12}$

$= \dfrac{(x+2)\cancel{(x+4)}}{(x+3)\cancel{(x+4)}}$

Answer $\dfrac{x+2}{x+3}$

4

Simplify fully $\dfrac{x^2 - 3x - 10}{x^2 - 25}$

$= \dfrac{\cancel{(x-5)}(x+2)}{\cancel{(x-5)}(x+5)}$

Answer $\dfrac{x+2}{x+5}$

5

Simplify fully $\dfrac{3x - 12}{x^2 - 4x}$

$\dfrac{\cancel{3(x-4)}}{x\cancel{(x-4)}}$

Answer $\dfrac{3}{x}$

6

Simplify fully $\dfrac{5x + 10}{x^2 + 9x + 14}$

$\dfrac{\cancel{5(x+2)}}{\cancel{(x+2)}(x+7)}$

Answer $\dfrac{5}{x+7}$

7

Ana simplifies $\dfrac{x^2 + 5}{x^2 + 2x}$ by crossing out the x^2 terms. She gets $\dfrac{5}{2x}$.

Explain her mistake.

Does the fraction simplify?

the x^2 terms are added, not factors

$x = 1$: $\frac{6}{3} = 2$, not $\frac{5}{2}$

Answer No, it does not simplify

8

Simplify fully $\dfrac{2x^2 + 7x + 6}{x^2 - 4}$

$= \dfrac{(2x+3)\cancel{(x+2)}}{(x-2)\cancel{(x+2)}}$

Answer $\dfrac{2x+3}{x-2}$

Simplifying algebraic fractions *further practice*

ANSWERS

9

Simplify fully $\dfrac{x^2-49}{x^2-4x-21}$

$\dfrac{(x-7)(x+7)}{(x-7)(x+3)}$

Answer $\dfrac{x+7}{x+3}$

10

Simplify fully $\dfrac{x^2-1}{3x^2+2x-1}$

$\dfrac{(x-1)(x+1)}{(3x-1)(x+1)}$

Answer $\dfrac{x-1}{3x-1}$

11

A cyclist rides $(x^2+9x+20)$ km in $(x+4)$ hours. Find her average speed in its simplest form.

$\text{speed} = \dfrac{x^2+9x+20}{x+4}$

$= \dfrac{(x+4)(x+5)}{x+4}$

Answer $(x+5)$ km/h

12

Find the missing denominator.

$\dfrac{x^2+x-20}{?} = \dfrac{x+5}{x+2}$

$x^2+x-20 = (x+5)(x-4)$

denominator $= (x-4)(x+2)$

Answer x^2-2x-8

13

Which of these fractions can be simplified? Simplify each one that can.

A $\dfrac{x+5}{x+10}$ **B** $\dfrac{x^2+5x}{5x}$

C $\dfrac{x^2-25}{x+5}$ **D** $\dfrac{x^2+25}{x+5}$

$B = \dfrac{x(x+5)}{5x} = \dfrac{x+5}{5}$

$C = x-5$; A and D do not

Answer B and C

14

Simplify $\dfrac{x^2+2x-15}{x^2-9}$

Then find its value when $x = 97$, without a calculator.

$\dfrac{(x+5)(x-3)}{(x+3)(x-3)} = \dfrac{x+5}{x+3}$

$\dfrac{102}{100} = \dfrac{51}{50}$

Answer $\dfrac{51}{50}$

15

Simplify fully $\dfrac{x^2+3x}{x-1} \times \dfrac{x^2-1}{x+3}$

$\dfrac{x(x+3)}{x-1} \times \dfrac{(x-1)(x+1)}{x+3}$

Answer $x(x+1)$

16

Jay simplifies $\dfrac{2x^2+6x}{4x+12}$ and gets $\dfrac{x}{2}$.

Kim gets $\dfrac{2x}{4}$. Who has simplified it fully? Explain.

$\dfrac{2x(x+3)}{4(x+3)} = \dfrac{2x}{4}$

2 still cancels in $\dfrac{2x}{4}$

Answer Jay