

Simplifying Algebraic Fractions - Worksheet

Skill

Group A - Multiplying and dividing algebraic fractions

Simplify:

$$1) \frac{3}{5} \times \frac{x}{y}$$

$$2) \frac{x}{y} \times \frac{3}{5}$$

$$3) \frac{x}{y} \times \frac{3}{6}$$

$$4) \frac{x}{y} \times \frac{3}{6x}$$

$$5) \frac{x}{xy} \times \frac{3}{6}$$

$$6) \frac{7x}{xy} \times \frac{3}{6}$$

$$7) \frac{7x}{xy} \times \frac{3}{6y}$$

$$8) \frac{7x}{xy} \div \frac{3}{6y}$$

$$9) \frac{7x}{xy} \div \frac{6y}{3}$$

$$10) \frac{7x}{xy} \times \frac{6y}{3} \times \frac{4y}{14}$$

$$11) \frac{7x}{xy} \div \frac{6y}{3} \times \frac{4y}{14}$$

$$12) \frac{7x}{xy} \div \frac{6y}{3} \div \frac{4y}{14}$$

Group B - Adding and subtracting algebraic fractions

Simplify:

$$1) \frac{x}{2} + \frac{x}{5}$$

$$2) \frac{x}{2} + \frac{4x}{5}$$

$$3) \frac{3x}{2} + \frac{4x}{5}$$

$$4) \frac{x}{2} - \frac{x}{5}$$

$$5) \frac{x}{5} - \frac{x}{2}$$

$$6) \frac{5x}{5} - \frac{x}{2}$$

$$7) \frac{5}{x} + \frac{2}{x}$$

$$8) \frac{5}{x^2} + \frac{2}{x}$$

$$9) \frac{5}{2x^2} - \frac{2}{x}$$

$$10) \frac{6}{2x^2} - \frac{2}{x}$$

$$11) \frac{6}{2x^2} + \frac{2}{x}$$

$$12) \frac{6}{2xy} + \frac{2}{x}$$

Group C - Simplifying algebraic fractions (factorising)

Simplify:

$$1) \frac{2(x+3)}{3(x+3)}$$

$$2) \frac{2(x+3)}{(x+3)}$$

$$3) \frac{(x+3)}{3(x+3)}$$

$$4) \frac{x+3}{2(x+3)}$$

$$5) \frac{x+3}{2x+6}$$

$$6) \frac{4x+12}{2x+6}$$

$$7) \frac{(x+3)(x+4)}{2x+6}$$

$$8) \frac{x^2+7x+12}{(x+4)(x-9)}$$

$$9) \frac{x^2+7x+12}{x^2-5x-36}$$

$$10) \frac{2x^2+14x+24}{x^2-5x-36}$$

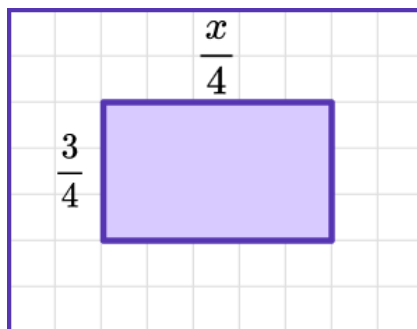
$$11) \frac{2x^2+14x+24}{3x^2-15x-108}$$

$$12) \frac{2x^2+14x+24}{3x^2-6x-45}$$

Simplifying Algebraic Fractions - Worksheet

Applied

- 1) Write an expression for the area of the rectangle.



- 2) Given that $x = \frac{a}{3}$, $y = \frac{ab}{4}$, $z = \frac{b^2}{2a}$, find an expression for:

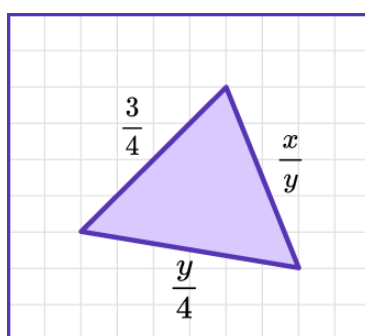
(a) x^2

(b) $x + y$

(c) $x - y$

(d) $\frac{xy}{z}$

- 3) Below is a triangle.



Write an expression for the perimeter as a single fraction.

- 4) The base of a triangle is $\frac{x}{10}$. The height of a triangle is $\frac{x}{4}$.
Find an expression for the area of the triangle.

Simplifying Algebraic Fractions - Exam Questions

- 1) Express the following as a single fraction. Give your answers in their simplest form.

(a) $\frac{p}{3} + \frac{p}{4}$

.....
(1)

(b) $\frac{7x}{18} + \frac{x}{3}$

.....
(1)

(c) $\frac{25y}{27} + \frac{2y}{9}$

.....
(1)
(3 marks)

2) (a) Simplify fully: $\frac{x-5}{3x-15}$

.....
(1)

(b) Simplify fully: $\frac{x^2 + x - 6}{x^2 - x - 12}$

.....
(2)
(3 marks)

Simplifying Algebraic Fractions - Exam Questions

3) (a) Simplify fully: $\frac{3a}{2} \times \frac{4}{5a}$

.....
(2)

(b) Simplify fully: $\frac{h}{2} \div \frac{h}{6}$

.....
(2)
(4 marks)

4) Simplify fully: $\frac{4x^2-25}{6x^2-11x-10}$

.....
(3)
(3 marks)

Simplifying Algebraic Fractions - Exam Questions

	Question	Answer
	Skill Questions	
Group A	Simplify: 1) $\frac{3}{5} \times \frac{x}{y}$ 2) $\frac{x}{y} \times \frac{3}{5}$ 3) $\frac{x}{y} \times \frac{3}{6}$ 4) $\frac{x}{y} \times \frac{3}{6x}$ 5) $\frac{x}{xy} \times \frac{3}{6}$ 6) $\frac{7x}{xy} \times \frac{3}{6}$ 7) $\frac{7x}{xy} \times \frac{3}{6y}$ 8) $\frac{7x}{xy} \div \frac{3}{6y}$ 9) $\frac{7x}{xy} \div \frac{6y}{3}$ 10) $\frac{7x}{xy} \times \frac{6y}{3} \times \frac{4y}{14}$ 11) $\frac{7x}{xy} \div \frac{6y}{3} \times \frac{4y}{14}$ 12) $\frac{7x}{xy} \div \frac{6y}{3} \div \frac{4y}{14}$	1) $\frac{3x}{5y}$ 2) $\frac{3x}{5y}$ 3) $\frac{3x}{6y} = \frac{x}{2y}$ 4) $\frac{3}{6y} = \frac{1}{2y}$ 5) $\frac{3}{6y} = \frac{1}{2y}$ 6) $\frac{7}{2y}$ 7) $\frac{7}{2y^2}$ 8) 14 9) $\frac{7}{2y^2}$ 10) $4y$ 11) $\frac{1}{y}$ 12) $\frac{49}{4y^3}$

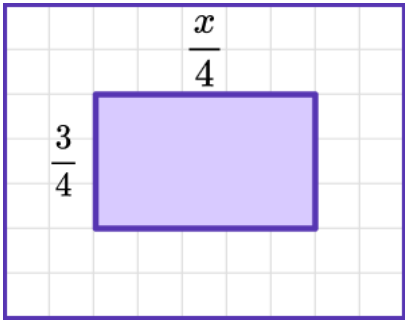
Simplifying Algebraic Fractions - Exam Questions

Group B	Simplify:	
	1) $\frac{x}{2} + \frac{x}{5}$	1) $\frac{7x}{10}$
	2) $\frac{x}{2} + \frac{4x}{5}$	2) $\frac{13x}{10}$
	3) $\frac{3x}{2} + \frac{4x}{5}$	3) $\frac{23x}{10}$
	4) $\frac{x}{2} - \frac{x}{5}$	4) $\frac{3x}{10}$
	5) $\frac{x}{5} - \frac{x}{2}$	5) $-\frac{3x}{10}$
	6) $\frac{5x}{5} - \frac{x}{2}$	6) $\frac{x}{2}$
	7) $\frac{5}{x} + \frac{2}{x}$	7) $\frac{7}{x}$
	8) $\frac{5}{x^2} + \frac{2}{x}$	8) $\frac{5+2x}{x^2}$
	9) $\frac{5}{2x^2} - \frac{2}{x}$	9) $\frac{5-4x}{2x^2}$
	10) $\frac{6}{2x^2} + \frac{2}{x}$	10) $\frac{3+2x}{x^2}$
	11) $\frac{6}{2x^2} - \frac{2}{x}$	11) $\frac{3-2x}{x^2}$
	12) $\frac{6}{2xy} + \frac{2}{x}$	12) $\frac{3+2y}{xy}$

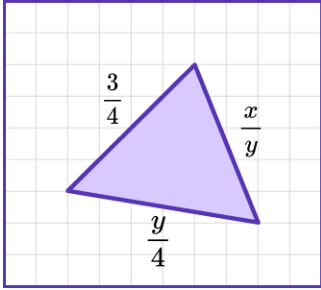
Simplifying Algebraic Fractions - Exam Questions

Group C	Simplify:	
	1) $\frac{2(x+3)}{3(x+3)}$	1) $\frac{2}{3}$
	2) $\frac{2(x+3)}{(x+3)}$	2) 2
	3) $\frac{(x+3)}{3(x+3)}$	3) $\frac{1}{3}$
	4) $\frac{x+3}{2(x+3)}$	4) $\frac{1}{2}$
	5) $\frac{x+3}{2x+6}$	5) $\frac{1}{2}$
	6) $\frac{4x+12}{2x+6}$	6) 2
	7) $\frac{(x+3)(x+4)}{2x+6}$	7) $\frac{x+4}{2}$
	8) $\frac{x^2+7x+12}{(x+4)(x-9)}$	8) $\frac{x+3}{x-9}$
	9) $\frac{x^2+7x+12}{x^2-5x-36}$	9) $\frac{x+3}{x-9}$
	10) $\frac{2x^2+14x+24}{x^2-5x-36}$	10) $\frac{2(x+3)}{x-9}$
	11) $\frac{2x^2+14x+24}{3x^2-15x-108}$	11) $\frac{2(x+3)}{3(x-9)}$
	12) $\frac{2x^2+14x+24}{3x^2-6x-45}$	12) $\frac{2(x+4)}{3(x-5)}$

Simplifying Algebraic Fractions - Exam Questions

	Question	Answer
	Applied Questions	
1)	Write an expression for the area of the rectangle. 	$\frac{3}{4} \times \frac{x}{4} = \frac{3x}{16}$
2)	Given $x = \frac{a}{3}$, $y = \frac{ab}{4}$, $z = \frac{b^2}{2a}$, find an expression for a) x^2 b) $x + y$ c) $x - y$ d) $\frac{xy}{z}$	a) $\frac{a}{3} \times \frac{a}{3} = \frac{a^2}{9}$ b) $\frac{a}{3} + \frac{ab}{4} = \frac{4a}{12} + \frac{3ab}{12} = \frac{4a+3ab}{12}$ c) $\frac{a}{3} - \frac{ab}{4} = \frac{4a}{12} - \frac{3ab}{12} = \frac{4a-3ab}{12}$ d) $xy = \frac{a}{3} \times \frac{ab}{4} = \frac{a^2b}{12}$ $\frac{xy}{z} = \frac{a^2b}{12} \div \frac{b^2}{2a} = \frac{a^2b}{12} \times \frac{2a}{b^2}$ $= \frac{2a^3b}{12b^2} = \frac{a^3}{6b}$

Simplifying Algebraic Fractions - Exam Questions

3)	Below is a triangle.  Write an expression for the perimeter as a single fraction.	$\frac{3}{4} + \frac{x}{y} + \frac{y}{4}$ $= \frac{3y}{4y} + \frac{4x}{4y} + \frac{y^2}{4y}$ $= \frac{3y + 4x + y^2}{4y}$
4)	The base of a triangle is $\frac{x}{10}$. The height of a triangle is $\frac{x}{4}$. Find an expression for the area of the triangle.	$\frac{x}{10} \times \frac{x}{4} = \frac{x^2}{40}$ $\frac{x^2}{40} \div 2 = \frac{x^2}{80}$

Simplifying Algebraic Fractions - Mark Scheme

	Question	Answer	
	Exam Questions		
1)	Express the following as a single fraction. Give your answers in their simplest form.		
(a)	$\frac{p}{3} + \frac{p}{4}$	(a) $\frac{4p}{12} + \frac{3p}{12} = \frac{7p}{12}$	(1)
(b)	$\frac{7x}{18} + \frac{x}{3}$	(b) $\frac{7x}{18} + \frac{6x}{18} = \frac{13x}{18}$	(1)
(c)	$\frac{25y}{27} + \frac{2y}{9}$	(c) $\frac{25y}{27} + \frac{6y}{27} = \frac{31y}{27}$ or $1\frac{4y}{27}$	(1)
2)	(a) Simplify fully: $\frac{x-5}{3x-15}$	(a) $\frac{x-5}{3x-15} = \frac{x-5}{3(x-5)} = \frac{1}{3}$	(1)
(b)	Simplify fully: $\frac{x^2+x-6}{x^2-x-12}$	(b) $\frac{(x-2)(x+3)}{(x+3)(x-4)}$ $\frac{x-2}{x-4}$	(1) (1)
3)	(a) Simplify fully: $\frac{3a}{2} \times \frac{4}{5a}$	(a) $\frac{12a}{10a}$ $\frac{6}{5}$ or $1\frac{1}{5}$	(1) (1)
(b)	Simplify fully: $\frac{h}{2} \div \frac{h}{6}$	(b) $\frac{h}{2} \times \frac{6}{h}$ or $\frac{6h}{2h}$ 3	(1) (1)
4)	Simplify fully: $\frac{4x^2-25}{6x^2-11x-10}$	$(2x-5)(2x+5)$ or $(2x-5)(3x+2)$ $\frac{(2x-5)(2x+5)}{(2x-5)(3x+2)}$ $\frac{2x+5}{3x+2}$	(1) (1) (1)

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