

*Algebraic Fractions - Lesson 1***Equivalence and Basic Simplification of Algebraic Fractions**LI

- Find equivalent fractions for fractions which have simple expressions in the numerator and/or denominator.
- Simplify fractions which have simple expressions in the numerator and/or denominator.

SC

- Rules of equivalence and simplification for fractions with numbers.

An **algebraic fraction** is a fraction with at least the numerator or denominator being an algebraic expression

To simplify any (numerical or algebraic) fraction, **divide top and bottom** by the **same** quantity

**Equivalent fractions** are fractions that are the same

To find an **equivalent fraction** to a given fraction, **multiply or divide top and bottom** of the given fraction by the **same quantity**

If the given fraction is divided by the same quantity, the given fraction is said to be **simplified**; it then has **smaller numbers** and/or **smaller powers of variables** than the given fraction

A fraction is said to be **fully simplified** if it cannot be simplified further

**Note : multiplying or dividing by 1 will not give an equivalent fraction that looks different to the given fraction**

Example 1

Find 3 equivalent fractions to  $\frac{x}{7}$ .

$$\frac{x}{7} \begin{array}{l} \times 3 \\ \times 3 \end{array} = \boxed{\frac{3x}{21}}$$

$$\frac{x}{7} \begin{array}{l} \times p \\ \times p \end{array} = \boxed{\frac{xp}{7p}}$$

$$\frac{x}{7} \begin{array}{l} \times x \\ \times x \end{array} = \boxed{\frac{x^2}{7x}}$$

Example 2

Simplify (fully) :  $\frac{12 p}{18}$

$$\frac{12 p}{18} \div 6 = \frac{2 p}{3}$$

Example 3

Simplify (fully) :  $\frac{3}{12 x}$

$$\frac{3}{12 x} \div 3 = \frac{1}{4 x}$$

Example 4

Simplify (fully) :  $\frac{8 b}{24 b}$

$$\frac{8 b}{24 b} \div 8 b = \frac{1}{3}$$

Example 5

$$\frac{x}{7} = \frac{\quad}{14}$$

$$\frac{x \times 2}{7 \times 2} = \frac{2 x}{14}$$

Example 6

$$\frac{60 m}{8 m} = \frac{15}{\quad}$$

$$\frac{60 m \div 4 m}{8 m \div 4 m} = \frac{15}{2}$$

1. $\frac{x}{4} = \frac{\quad}{8}$	13. $\frac{x}{y} = \frac{\quad}{3y}$	25. $\frac{p}{q} = \frac{pq}{\quad}$	37. $\frac{15e}{12} = \frac{\quad}{4}$	49. $\frac{2t}{12t} = \frac{\quad}{6}$
2. $\frac{x}{5} = \frac{\quad}{15}$	14. $\frac{a}{b} = \frac{\quad}{5b}$	26. $\frac{x}{y} = \frac{xy}{\quad}$	38. $\frac{10}{16m} = \frac{5}{\quad}$	50. $\frac{9u}{15u} = \frac{\quad}{5}$
3. $\frac{a}{3} = \frac{\quad}{3b}$	15. $\frac{p}{q} = \frac{\quad}{qr}$	27. $\frac{a}{b} = \frac{a^2}{\quad}$	39. $\frac{8}{10n} = \frac{4}{\quad}$	51. $\frac{9v}{6v} = \frac{\quad}{2}$
4. $\frac{c}{2} = \frac{\quad}{2d}$	16. $\frac{x}{y} = \frac{\quad}{yz}$	28. $\frac{d}{e} = \frac{d^2}{\quad}$	40. $\frac{14}{8p} = \frac{7}{\quad}$	52. $\frac{12m}{4m} = \frac{\quad}{\quad}$
5. $\frac{m}{5} = \frac{\quad}{5m}$	17. $\frac{r}{s} = \frac{\quad}{s^2}$	29. $\frac{6x}{8} = \frac{\quad}{4}$	41. $\frac{4}{2q} = \frac{2}{\quad}$	53. $\frac{16n}{20n} = \frac{\quad}{5}$
6. $\frac{n}{8} = \frac{\quad}{8n}$	18. $\frac{c}{d} = \frac{\quad}{d^2}$	30. $\frac{10y}{12} = \frac{\quad}{6}$	42. $\frac{6}{9r} = \frac{2}{\quad}$	54. $\frac{4a}{10a} = \frac{2}{\quad}$
7. $\frac{5}{p} = \frac{20}{\quad}$	19. $\frac{u}{v} = \frac{\quad}{uv}$	31. $\frac{2z}{10} = \frac{\quad}{5}$	43. $\frac{12}{15s} = \frac{4}{\quad}$	55. $\frac{2b}{8b} = \frac{1}{\quad}$
8. $\frac{6}{q} = \frac{18}{\quad}$	20. $\frac{m}{n} = \frac{\quad}{mn}$	32. $\frac{8a}{6} = \frac{\quad}{3}$	44. $\frac{8}{20u} = \frac{2}{\quad}$	56. $\frac{10c}{6c} = \frac{5}{\quad}$
9. $\frac{2}{u} = \frac{2v}{\quad}$	21. $\frac{p}{q} = \frac{5p}{\quad}$	33. $\frac{6b}{4} = \frac{\quad}{2}$	45. $\frac{4}{16v} = \frac{1}{\quad}$	57. $\frac{10d}{15d} = \frac{2}{\quad}$
10. $\frac{4}{x} = \frac{4y}{\quad}$	22. $\frac{x}{y} = \frac{9x}{\quad}$	34. $\frac{6t}{15} = \frac{\quad}{5}$	46. $\frac{4x}{6x} = \frac{\quad}{3}$	58. $\frac{12e}{16e} = \frac{3}{\quad}$
11. $\frac{3}{z} = \frac{3z}{\quad}$	23. $\frac{a}{b} = \frac{ac}{\quad}$	35. $\frac{9c}{12} = \frac{\quad}{4}$	47. $\frac{6y}{10y} = \frac{\quad}{5}$	59. $\frac{16e}{20m} = \frac{5}{\quad}$
12. $\frac{7}{t} = \frac{7t}{\quad}$	24. $\frac{r}{s} = \frac{rt}{\quad}$	36. $\frac{3d}{9} = \frac{\quad}{3}$	48. $\frac{12z}{10z} = \frac{\quad}{5}$	60. $\frac{8m}{12n} = \frac{1}{\quad}$

Q 1 - 28  
(equivalents)

Q 29 - 60  
(simplifying)

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3. $\frac{a}{3} = \frac{ab}{3b}$	15. $\frac{p}{q} = \frac{pr}{qr}$	27. $\frac{a}{b} = \frac{a^2}{ab}$	39. $\frac{8}{10n} = \frac{4}{5n}$	51. $\frac{9v}{6v} = \frac{3}{2}$
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