Fractions and Algebraic Fractions

Recap algebra…

$3x \times x =$	$\frac{8x^2}{12x} =$	$2x^2(x+3) =$	$(x+2)(x+3) =$	$(2x+3)(x-2) =$

Cancelling down fractions…

$\frac{10}{40} =$	$\frac{27}{63} =$	$\frac{21}{7} =$	$\frac{5}{8} = \frac{?}{24}$	$\frac{24}{40} = \frac{?}{100}$

Cancelling down algebraic fractions…

$\frac{10x^3}{35x^2} =$	$\frac{27x^2y^3}{18xy^4} =$	$\frac{3x^2-9x}{2x-6} =$	$\frac{x^2+5x+6}{x^2+7x+12} =$	$\frac{x^2-9}{x^2-x-6} =$

Multiplying fractions…

$\frac{1}{4} \times \frac{3}{5} =$	$\frac{2}{7} \times \frac{2}{9} =$	$\frac{2}{7} \times \frac{5}{6} =$	$\frac{3}{8} \times \frac{4}{9} =$	$\frac{12}{25} \times \frac{5}{24} =$

Multiplying algebraic fractions…

$\frac{x}{4} \times \frac{3x}{5} =$	$\frac{2x}{7} \times \frac{2}{x} =$	$\frac{2x^2}{7} \times \frac{x+1}{6} =$	$\frac{x-1}{8} \times \frac{4}{x+1} =$	$\frac{x+2}{x-2} \times \frac{x+3}{x+4} =$

Dividing fractions…

$\frac{1}{4} \div \frac{3}{5} =$	$\frac{2}{7} \div \frac{2}{9} =$	$\frac{2}{7} \div \frac{5}{21} =$	$\frac{3}{8} \div \frac{9}{16} =$	$\frac{12}{25} \div \frac{12}{35} =$

Dividing algebraic fractions…

$\frac{x}{4} \div \frac{3}{5x} =$	$\frac{2x}{7} \div \frac{2}{x} =$	$\frac{x+3}{7} \div \frac{5}{x+4} =$	$\frac{x-1}{8} \div \frac{x+1}{x+2} =$	$\frac{12}{x-1} \div \frac{x-1}{x+2} =$

Adding and subtracting fractions…

$\frac{7}{15} + \frac{8}{15} =$	$\frac{2}{7} + \frac{1}{21} =$	$\frac{7}{8} - \frac{1}{6} =$	$\frac{3}{8} + \frac{8}{9} =$	$\frac{5}{7} - \frac{2}{9} =$

Adding and subtracting algebraic fractions…

$\frac{3}{x-1} + \frac{2}{x+3} =$	$\frac{2}{x+4} + \frac{1}{x-3} =$	$\frac{x}{x-3} - \frac{2}{x+2} =$	$\frac{2x}{x+2} - \frac{1}{x-2} =$	$\frac{2x+1}{x-2} + \frac{3x}{x+4} =$

Fractions and Algebraic Fractions - Answers

Recap algebra…

$3x \times x = 3x^2$	$\frac{8x^2}{12x} = \frac{2}{3x}$	$2x^2(x+3) = 2x^3 + 6x^2$	$(x+2)(x+3) = x^2 + 5x + 6$	$(2x+3)(x-2) = 2x^2 - x - 6$

Cancelling down fractions…

$\frac{10}{40} = \frac{1}{4}$	$\frac{27}{63} = \frac{3}{7}$	$\frac{21}{7} = 3$	$\frac{5}{8} = \frac{15}{24}$	$\frac{24}{40} = \frac{60}{100}$

Cancelling down algebraic fractions…

$\frac{10x^3}{35x^2} = \frac{2x}{7}$	$\frac{27x^2y^3}{18xy^4} = \frac{3x}{2y}$	$\frac{3x^2 - 9x}{2x - 6} = \frac{3 - x}{2}$	$\frac{x^2 + 5x + 6}{x^2 + 7x + 12} = \frac{x + 2}{x + 4}$	$\frac{x^2 - 9}{x^2 - x - 6} = \frac{x + 3}{x + 2}$

Multiplying fractions…

$\frac{1}{4} \times \frac{3}{5} = \frac{3}{20}$	$\frac{2}{7} \times \frac{2}{9} = \frac{4}{63}$	$\frac{2}{7} \times \frac{5}{6} = \frac{10}{42} = \frac{5}{21}$	$\frac{3}{8} \times \frac{4}{9} = \frac{12}{72} = \frac{1}{6}$	$\frac{12}{25} \times \frac{5}{24} = \frac{1}{10}$

Multiplying algebraic fractions…

$\frac{x}{4} \times \frac{3x}{5} = \frac{3x^2}{20}$	$\frac{2x}{7} \times \frac{2}{x} = \frac{4x}{7x} = \frac{4}{7}$	$\frac{2x^2}{7} \times \frac{x+1}{6} = \frac{2x^3 + 2x^2}{42} = \frac{x^3 + x^2}{21}$	$\frac{x-1}{8} \times \frac{4}{x+1} = \frac{4(x-1)}{8(x+1)} = \frac{x-1}{2x+2}$	$\frac{x+2}{x-2} \times \frac{x+3}{2x+3} = \frac{x^2 + 5x + 6}{2x^2 + 2x - 6}$

Dividing fractions…

$\frac{1}{4} \div \frac{3}{5} = \frac{5}{12}$	$\frac{2}{7} \div \frac{2}{9} = \frac{9}{7} = 1\frac{2}{7}$	$\frac{2}{7} \div \frac{5}{21} = \frac{6}{5} = 1\frac{1}{5}$	$\frac{3}{8} \div \frac{9}{16} = \frac{2}{3}$	$\frac{12}{25} \div \frac{12}{35} = \frac{7}{5} = 1\frac{2}{5}$

Dividing algebraic fractions…

$\frac{x}{4} \div \frac{3}{5x} = \frac{5x^2}{12}$	$\frac{2x}{7} \div \frac{2}{x} = \frac{2x^2}{14} = \frac{x^2}{7}$	$\frac{x+3}{7} \div \frac{5}{x+4} = \frac{x^2 + 7x + 12}{35}$	$\frac{x-1}{8} \div \frac{x+1}{x+2} = \frac{x^2 + x - 2}{8x + 8}$	$\frac{12}{x-1} \div \frac{x-1}{x+2} = \frac{12x + 24}{x^2 - 2x + 1}$

Adding and subtracting fractions…

$\frac{7}{15} + \frac{8}{15} = \frac{15}{15} = 1$	$\frac{2}{7} + \frac{1}{21} = \frac{7}{21} = \frac{1}{3}$	$\frac{7}{8} - \frac{1}{6} = \frac{17}{24}$	$\frac{3}{8} + \frac{8}{9} = \frac{91}{72} = 1\frac{19}{72}$	$\frac{5}{7} - \frac{2}{9} = \frac{31}{63}$

Adding and subtracting algebraic fractions…

$\frac{5x + 7}{(x-1)(x+3)}$	$\frac{3x - 2}{(x-3)(x+4)}$	$\frac{x^2 + 6}{(x-3)(x+2)}$	$\frac{2x^2 - 5x - 2}{x^2 - 4}$	$\frac{5x^2 + 3x + 4}{(x-2)(x+4)}$

Exam type questions

(These ones taken from Justmaths)

1 Express as a single fraction.

$$\frac{m+1}{n+1} - \frac{m}{n}$$

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2 Show that $\frac{2x+1}{3} + \frac{5x-2}{2}$ simplifies to $\frac{19x-4}{6}$

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3 Show that $\frac{1}{6x^2+7x-5} \div \frac{1}{4x^2-1}$ simplifies to $\frac{ax+b}{cx+d}$

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4 Show that $\frac{a}{b+1} - \frac{a}{(b+1)^2}$ can be written as $\frac{ab}{(b+1)^2}$

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5 Show that $\frac{2x^2-3x-5}{x^2+6x+5}$ can be written in the form $\frac{ax+b}{cx+d}$

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6 Show that

$$\frac{4}{x-3} - \frac{2}{x+1} = \frac{2(x+5)}{(x-3)(x+1)}$$

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7 Solve $\frac{x+2}{3x} + \frac{x-2}{2x} = 3$

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8 Given that

$$2x - 1 : x - 4 = 16x + 1 : 2x - 1$$

find the possible values of x.