Fractions

Simplify: $\dfrac{15}{12}$, $\dfrac{10}{35}$, $\dfrac{24}{108}$,

$\dfrac{3}{16} + \dfrac{5}{16}$, $\dfrac{1}{3} + \dfrac{1}{6}$, $\dfrac{11}{14} - \dfrac{2}{7}$,

$\dfrac{3}{4} + \dfrac{2}{5}$, $2 + \dfrac{3}{7}$,

$\dfrac{3}{8} \times \dfrac{2}{5}$, one third of $6/7$, $\dfrac{20}{9} \times \dfrac{6}{10} \times \dfrac{3}{4}$

$1 \div \dfrac{1}{8}$, $\dfrac{2}{3} \div \dfrac{1}{4}$, $\dfrac{6/7}{3/5}$, $\dfrac{\frac{1}{2} - \frac{1}{6}}{\frac{5}{9} - \frac{1}{3}}$
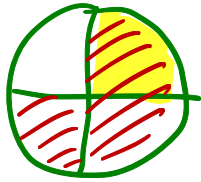
Solve $\qquad \dfrac{3x+4}{x+5} = \dfrac{5}{3}$

Fractions

$$\frac{1}{2}$$
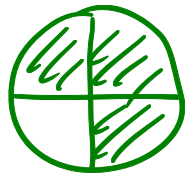
$$\frac{1+1}{2+1} = \frac{2}{3}$$

simplified — numerator

$$\boxed{\frac{3}{4}} = 3 \div 4 = \frac{6}{8} = \frac{3 \times 2}{4 \times 2}$$

denominator

$$\boxed{\frac{11}{4}} = 2 + \frac{3}{4} = \boxed{2\frac{3}{4}}$$

improper fraction

mixed number

$$2x$$

$$2\frac{3}{4}$$

$$2 \times \frac{3}{4}$$

$$2 + \frac{3}{4}$$

$$\boxed{\text{Fractions}}$$

$$\frac{a \div m}{b \div m} = \frac{a}{b} = \frac{a \times n}{b \times n}$$

Simplify: $\quad \dfrac{15}{12} = \dfrac{15 \div 3}{12 \div 3} = \dfrac{5}{4}$

$$\frac{10}{35} = \frac{2 \times \cancel{5}}{7 \times \cancel{5}} = \frac{2}{7}$$

$$\frac{24}{108} = \frac{8 \times \cancel{3}}{36 \times \cancel{3}} = \frac{8}{36} = \frac{2 \times \cancel{4}}{9 \times \cancel{4}} = \frac{2}{9}$$

Fractions

Simplify:

$$\frac{3}{16} + \frac{5}{16} = \frac{3+5}{16} = \frac{8}{16} = \frac{8 \times 1}{8 \times 2} = \frac{1}{2}$$

$$\frac{1}{5} + \frac{3}{5} = \frac{1+3}{5}$$
$$= \frac{4}{5}$$

$$\frac{1}{3} + \frac{1}{6} = \frac{2}{6} + \frac{1}{6} = \frac{2+1}{6} = \frac{3 \div 3}{6 \div 8} = \frac{1}{2}$$

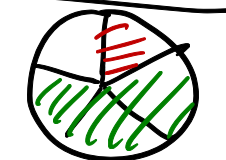$$\frac{1 \times 2}{3 \times 2} = \frac{2}{6}$$

$$\frac{11}{14} - \frac{2}{7} = \frac{11}{14} - \frac{2 \times 2}{7 \times 2} = \frac{11}{14} - \frac{4}{14} = \frac{11-4}{14} = \frac{7 \div 7}{14 \div 7}$$
$$= \frac{1}{2}$$

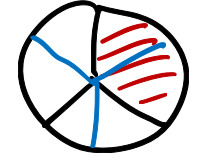$$\frac{3}{5} - \frac{1}{5} = \frac{3-1}{5}$$
$$= \frac{2}{5}$$

$$\frac{3}{4} + \frac{2}{5} = \frac{3 \times 5}{4 \times 5} + \frac{2 \times 4}{5 \times 4} = \frac{15}{20} + \frac{8}{20} = \frac{15+8}{20}$$
$$= \frac{23}{20}$$
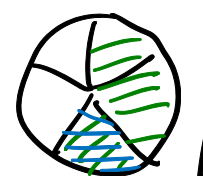
$$2 + \frac{3}{7} = \frac{2}{1} + \frac{3}{7}$$

4, 8, 12, 16, 20

$$= \frac{2 \times 7}{1 \times 7} + \frac{3}{7} = \frac{14}{7} + \frac{3}{7} = \frac{17}{7}$$

Fractions

$$\frac{a}{b} \times \frac{m}{n} = \frac{a \times m}{b \times n}$$

Simplify:

$$\frac{3}{8} \times \frac{2}{5} = \frac{3 \times 2}{8 \times 5} = \frac{6 \div 2}{40 \div 2} = \frac{3}{20}$$

one third $\boxed{of}$ 6/7 $= \frac{1}{3} \times \frac{6}{7} = \frac{1 \times 6}{3 \times 7} = \frac{6}{21} = \frac{2 \times 3}{7 \times 3} = \frac{2}{7}$
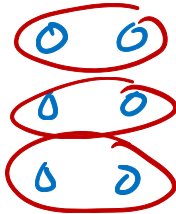
$$\frac{20}{9} \times \frac{6}{10} \times \frac{3}{4} = \frac{20 \times 6 \times 3}{9 \times 10 \times 4} = \frac{2 \times 2}{4} = \frac{4}{4} = 1$$

$$\boxed{\text{Fractions}}$$

$$\frac{a}{b} \div \frac{m}{n} = \frac{a}{b} \times \frac{n}{m}$$

$6 \div 2 = 3$

$6 = 3 \times 2$ ✓
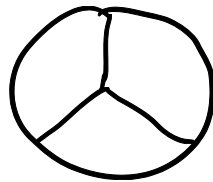
$$\frac{6}{1} \div \frac{2}{1} = \frac{6}{1} \times \frac{1}{2} = \frac{6 \times 1}{1 \times 2}$$
$$= \frac{6}{2}$$
$$= 3 ✓$$

$1 \div \frac{1}{3} = 3$

$1 = 3 \times \frac{1}{3}$ ✓
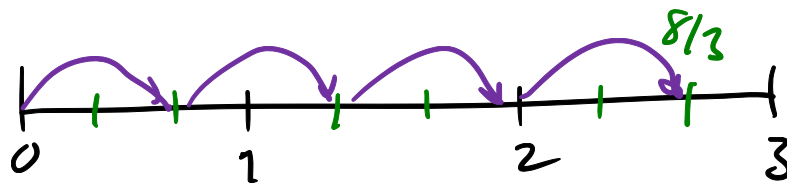
$$1 \div \frac{1}{3} = \frac{1}{1} \div \frac{1}{3} = \frac{1}{1} \times \frac{3}{1} = \frac{1 \times 3}{1 \times 1} = \frac{3}{1}$$
$$= 3 ✓$$

$\frac{8}{3} \div \frac{2}{3} = 4$

$\frac{8}{3} = 4 \times \frac{2}{3} = \frac{4}{1} \times \frac{2}{3} = \frac{4 \times 2}{1 \times 3} = \frac{8}{3}$ ✓

$$\frac{8}{3} \div \frac{2}{3} = \frac{8}{3} \times \frac{3}{2} = \frac{8 \times 3}{3 \times 2} = \frac{8}{2} = 4$$
✓

$$\boxed{\text{Fractions}} \qquad \boxed{\dfrac{a}{b} \div \dfrac{m}{n} = \dfrac{a}{b} \times \dfrac{n}{m}}$$

Simplify:

$$\frac{2}{3} \div \frac{1}{4} = \frac{2}{3} \times \frac{4}{1} = \frac{2 \times 4}{3 \times 1} = \underline{\underline{\frac{8}{3}}}$$

$$\frac{6/7}{3/5} = \frac{6}{7} \div \frac{3}{5} = \frac{6}{7} \times \frac{5}{3} = \frac{\overset{2}{6} \times 5}{7 \times \cancel{3}} = \frac{10}{7}$$

$$\frac{\frac{1}{2} - \frac{1}{6}}{\frac{5}{9} - \frac{1}{3}} = \frac{\frac{1 \times 3}{2 \times 3} - \frac{1}{6}}{\frac{5}{9} - \frac{1 \times 3}{3 \times 3}} = \frac{\frac{3}{6} - \frac{1}{6}}{\frac{5}{9} - \frac{3}{9}} = \frac{\left(\frac{2}{6}\right)}{\left(\frac{2}{9}\right)} = \frac{\cancel{2}}{2\cancel{6}} \times \frac{\cancel{9}^{3}}{\cancel{2}} = \frac{3}{2}$$

$$\frac{\left(\frac{1}{2} - \frac{1}{6}\right) \times 18}{\left(\frac{5}{9} - \frac{1}{3}\right) \times 18} = \frac{\frac{1}{2} \times 18 - \frac{1}{6} \times 18}{\frac{5}{9} \times 18 - \frac{1}{3} \times 18} = \frac{9 - 3}{10 - 6} = \frac{6 \div 2}{4 \div 2} = \underline{\underline{\frac{3}{2}}}$$

Fractions

cross-multiplication

Solve $\dfrac{3x+4}{x+5} = \dfrac{5}{3}$

$(3x+4) \times 3 = 5 \times (x+5)$

$9x + 12 = 5x + 25$

$9x = 5x + 25 - 12$

$9x - 5x = 25 - 12$

$4x = 13$

$x = \dfrac{13}{4}$

$\dfrac{a}{b} = \dfrac{m}{n}$

$\Longleftrightarrow \quad \dfrac{a \times n}{b \times n} = \dfrac{m \times b}{n \times b}$

$\Longleftrightarrow \quad a \times n = m \times b$

---

check

$\dfrac{(3\left(\frac{13}{4}\right)+4) \times 4}{(\left(\frac{13}{4}\right)+5) \times 4} = \dfrac{3 \times 13 + 4 \times 4}{13 + 5 \times 4}$

$= \dfrac{39 + 16}{13 + 20}$

$= \dfrac{55}{33} = \dfrac{5 \times 11}{3 \times 11}$