

FRACTIONS

Note Title

20/11/2009

Note: the top of a fraction is the NUMERATOR
the bottom " " " " DENOMINATOR

Improper Fractions and Mixed Numbers

An "improper" fraction is "top-heavy" eg. $\frac{10}{3}$.

We can turn these into mixed numbers by dividing

$$\text{eg } \frac{10}{3} = 3\frac{1}{3}$$

or we can do the reverse

$$\text{e.g } 5\frac{3}{4} = \frac{23}{4} \quad (5 \times 4 + 3 = 23)$$

Adding and Subtracting

- Make sure the fractions have the same denominator first.

Example 1

$$\begin{aligned} \frac{5}{12} + \frac{7}{8} &= \frac{10}{24} + \frac{21}{24} \\ &= \frac{31}{24} \\ &= 1\frac{7}{24} \end{aligned}$$

12 and 8 are both factors of 24

Don't add the denominators!

Example 2

$$7\frac{3}{5} + 4\frac{7}{10}$$

- Add the whole numbers, then add the fractions

$$\begin{aligned} &= 11 + \frac{6}{10} + \frac{7}{10} \\ &= 11 + \frac{13}{10} \\ &= 11 + 1\frac{3}{10} \\ &= 12\frac{3}{10} \end{aligned}$$

Example 3

$$8\frac{2}{7} - 3\frac{2}{3}$$

$$\begin{aligned} &= 5 + \frac{6}{21} - \frac{14}{21} \\ &= 5 - \frac{8}{21} \\ &= 4 + \frac{21}{21} - \frac{8}{21} \\ &= 4\frac{13}{21} \end{aligned}$$

"Borrow" 1 from the 5 and change it to $\frac{21}{21}$

Multiplying

- No need to make the denominators the same.
- Any mixed numbers MUST be turned into improper fractions before multiplying.
- Multiply the bottoms as well as the tops
- We can 'cancel' any number on the top with any suitable number on the bottom either before or after multiplying

Examples

①

$$\frac{5}{6} \times \frac{9}{10}$$

$$= \frac{45}{60}$$

or

$$\frac{\cancel{5}^1}{\cancel{6}_2} \times \frac{\cancel{9}^3}{\cancel{10}_2}$$

(divide top and bottom by 15)

$$= \frac{3}{4}$$

$$= \frac{3}{4}$$

②

$$2\frac{1}{4} \times 1\frac{7}{5}$$

$$= \frac{\cancel{3}^3 \cancel{9}^1}{\cancel{4}_2} \times \frac{\cancel{22}^2}{\cancel{5}_5}$$

$$= \frac{33}{10} = 3\frac{3}{10}$$

must make these improper fractions first

③

$$4 \times 2\frac{5}{8}$$

$$= \frac{\cancel{4}^1}{1} \times \frac{21}{\cancel{8}_2}$$

$$= \frac{21}{2} \text{ or } \underline{\underline{10\frac{1}{2}}}$$

Write a whole number
n as $\frac{n}{1}$

④

$$\frac{5}{6} \text{ of } 33$$

$$= \frac{5}{\cancel{6}_2} \times \frac{\cancel{33}^1}{1}$$

$$= \frac{55}{2} = \underline{\underline{27\frac{1}{2}}}$$

A fraction OF an amount
is found by multiplying

Dividing

- Turn any mixed numbers into improper fractions first.
- Invert the second fraction (turn it upside down) and change the \div into a \times .

Examples

$$\begin{aligned} \textcircled{1} \quad \frac{2}{3} \div \frac{4}{9} &= \frac{\cancel{2}^1}{\cancel{3}_1} \times \frac{\cancel{9}^3}{\cancel{4}_2} \\ &= \frac{3}{2} = \underline{\underline{1\frac{1}{2}}} \end{aligned}$$

$$\begin{aligned} \textcircled{2} \quad 3\frac{1}{3} \div 2\frac{2}{5} \\ &= \frac{10}{3} \div \frac{12}{5} \\ &= \frac{\cancel{5}^5}{\cancel{3}_1} \times \frac{\cancel{5}}{\cancel{12}_6} \\ &= \frac{25}{18} = \underline{\underline{1\frac{7}{18}}} \end{aligned}$$

We can't cancel yet!
Not until we are multiplying.

$$\begin{aligned} \textcircled{3} \quad 1\frac{7}{8} \div 6 \\ &= \frac{15}{8} \div \frac{6}{1} \\ &= \frac{\cancel{6}^6}{\cancel{8}_4} \times \frac{\cancel{1}}{\cancel{6}_2} \\ &= \underline{\underline{\frac{5}{4}}} \end{aligned}$$