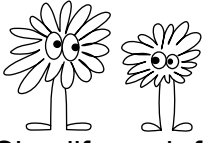


# FRACTION NINJA BOOTCAMP LEVEL 3





# MULTIPLYING FRACTIONS



Simplify each fractional expression.

$$\frac{5}{8} \times \frac{3}{7} =$$

$$\frac{11}{12} \times \frac{3}{4} =$$

$$\frac{5}{24} \times \frac{8}{9} =$$

$$\frac{4}{14} \times \frac{7}{18} =$$

$$\frac{11}{12} \times \frac{18}{20} =$$

$$\frac{3}{8} \times \frac{4}{15} =$$

$$\frac{6}{5} \times \frac{20}{21} =$$

$$\frac{12}{25} \times \frac{10}{9} =$$

$$\frac{20}{32} \times \frac{4}{5} =$$

$$\frac{13}{16} \times \frac{2}{3} =$$

$$\frac{9}{28} \times \frac{80}{27} =$$

$$\frac{15}{16} \times \frac{24}{25} =$$

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

$$3\frac{3}{5} \times 2\frac{2}{3} =$$

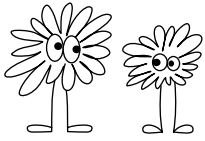
$$\frac{9}{16} \times 3\frac{1}{21} =$$

$$3\frac{3}{10} \times 1\frac{4}{11} =$$

$$\frac{12}{17} \times 6\frac{3}{8} =$$

$$6\frac{1}{4} \times 1\frac{1}{15} =$$

Paul had  $\frac{4}{5}$  of a cake. He gave  $\frac{2}{3}$  of his portion to John. John then gave  $\frac{3}{4}$  of his cake to Ringo. Ringo ate half of his cake and gave the rest to George. What fraction of the original cake did George get?



# DIVIDING FRACTIONS



Simplify each fractional expression.

$$\frac{2}{9} \div \frac{8}{3} =$$

$$\frac{8}{15} \div \frac{4}{3} =$$

$$\frac{15}{8} \div \frac{8}{3} =$$

$$\frac{6}{25} \div \frac{3}{20} =$$

$$\frac{10}{9} \div \frac{5}{3} =$$

$$\frac{7}{18} \div \frac{14}{15} =$$

$$\frac{13}{24} \div \frac{3}{4} =$$

$$\frac{22}{7} \div \frac{11}{14} =$$

$$\frac{25}{18} \div \frac{10}{27} =$$

$$\frac{8}{21} \div \frac{12}{35} =$$

$$\frac{16}{15} \div \frac{12}{5} =$$

$$\frac{9}{49} \div \frac{15}{14} =$$

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

$$5\frac{5}{8} \div 1\frac{2}{3} =$$

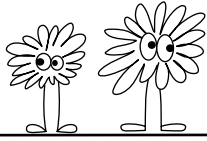
$$4\frac{2}{7} \div 1\frac{1}{14} =$$

$$2\frac{7}{9} \div 5 =$$

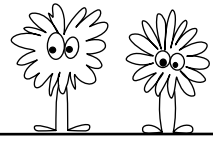
$$21 \div 4\frac{2}{3} =$$

$$1\frac{2}{3} \div 4\frac{5}{6} =$$

Molly has a board that is  $18\frac{1}{2}$  feet long. How many of pieces of length  $\frac{3}{4}$  ft can Molly make if she cuts up the board?



# COMMON MULTIPLES



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For each pair of numbers, find the least common multiple

24, 32

16, 36

9, 19

24, 12

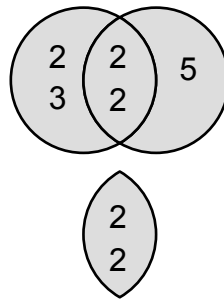
30, 8

12, 20

The lesson showed a cool way to find the least common multiple (LCM) of two numbers and their greatest common factor (GCF) using their prime factorizations and a Venn diagram. Below is an example for the numbers 20 and 24.

$$24 = 2 \times 2 \times 2 \times 3$$

$$20 = 2 \times 2 \times 5$$



$$\text{LCM}(24, 20) = 2 \times 2 \times 2 \times 3 \times 5 = 120$$

$$\text{GCF}(24, 20) = 2 \times 2 = 4$$

The least common multiple came from multiplying each prime factor in the Venn diagram of factors. The greatest common factor came from multiplying the prime factors that were common to both circles. The four factors of 24 and three factors of 20 each showed up exactly once between the two diagrams above, so that means  $24 \times 20 = \text{LCM}(24, 20) \times \text{GCF}(24, 20)$ . A similar fact is true for all pairs of numbers,  $a$  and  $b$ .  $a \times b = \text{LCM}(a, b) \times \text{GCF}(a, b)$

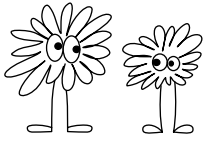
Using that formula, you can find the LCM if you know the GCF. We could find

$$\text{LCM}(24, 20) = \frac{24 \times 20}{\text{GCF}(24, 20)} = \frac{24 \times 20}{4} = 120$$

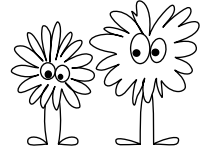
For each pair of numbers, find the least common multiple. Can you do it using the technique described above (multiplying the two numbers and dividing by their greatest common factor)?

19, 21

55, 45



# ADDING AND SUBTRACTING FRACTIONS



Simplify each fractional expression.

$$\frac{2}{9} + \frac{2}{3} =$$

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

$$\frac{3}{7} + \frac{5}{9} =$$

$$\frac{11}{24} - \frac{1}{4} =$$

$$\frac{5}{6} + \frac{3}{10} =$$

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

$$\frac{5}{8} + \frac{5}{16} =$$

$$\frac{17}{20} - \frac{3}{8} =$$

$$\frac{16}{25} + \frac{3}{10} =$$

$$\frac{33}{40} - \frac{3}{4} =$$



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

$$2\frac{5}{8} - 1\frac{2}{3} =$$

$$5\frac{3}{10} + 3\frac{5}{6} =$$

$$12\frac{1}{8} - 5\frac{1}{3} =$$

$$4\frac{5}{12} + 1\frac{7}{8} =$$

$$9\frac{3}{4} - 3\frac{7}{8} =$$

The final problem asks you to add and subtract multiple fractions at once. You can deal with them two-at-a-time or tackle the whole problem in one attempt by getting a common denominator for all four fractions. Take your time and write out all the steps so you can check your work.

$$1\frac{1}{6} + 2\frac{3}{5} + 1\frac{1}{4} - 3\frac{3}{4} =$$

# PUTTING IT ALL TOGETHER

Simplify each expression. Be careful to do neat work so you avoid mistakes.

$$\frac{4 - \frac{3+3}{2}}{5} =$$

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

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

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

$$\frac{\frac{\frac{1}{4}}{2} - \frac{3}{5}}{\frac{8}{6} - \frac{7}{7}} =$$

$$\frac{2}{3} + \frac{4}{5} + \frac{3}{4} + \frac{1}{2} =$$

$$\frac{2 \cdot \frac{5}{8} + 1}{3 - \frac{3}{8}} =$$

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

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

$$9 - \frac{4 - \frac{5 - \frac{3}{2}}{3}}{5} =$$