

## 2.2: Operations with Fractions

### Useful Facts

For the following, let  $a$ ,  $b$ ,  $c$ , and  $d$  represent real numbers.

- $\frac{a}{0}$  does not exist.
- $a \cdot 1 = a$
- $\frac{a}{1} = a$
- $\frac{a}{a} = 1$  as long as  $a \neq 0$
- $\frac{a}{b} \cdot \frac{c}{d} = \frac{ac}{bd}$

In other words, to multiply fractions, multiply the numerators together and multiply the denominators together.

- $\frac{a}{b} \div \frac{c}{d} = \frac{a}{b} \cdot \frac{d}{c} = \frac{ad}{bc}$

In other words, to divide fractions, multiply by the reciprocal of what you're dividing by.

- $\frac{a}{b} + \frac{c}{b} = \frac{a+c}{b}$

In other words, you can add fractions as long as they have the same denominators. To do so, just add the numerators and keep the denominator.

- $\frac{a}{b} - \frac{c}{b} = \frac{a-c}{b}$

In other words, you can subtract fractions as long as they have the same denominators. To do so, just subtract the numerators and keep the denominator.

For the following, perform the indicated operation. Be sure to simplify your answer.

1.  $\frac{1}{2} \cdot \frac{3}{4}$

2.  $\frac{1}{2} \div \frac{3}{4}$

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

4.  $\frac{25}{36} - \frac{11}{36}$

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5.  $\frac{7}{21} + \frac{12}{21}$

6.  $\frac{2}{5} - \frac{1}{10}$

7.  $\frac{1}{12} + \frac{3}{16}$

8.  $\frac{5}{12} \cdot \frac{4}{7}$

9.  $\frac{7}{8} \div \frac{9}{4}$

10.  $\frac{121}{35} - \frac{15}{21}$

11.  $\frac{117}{84} + \frac{10}{63}$

12.  $\frac{3}{8} + \frac{5}{10} + \frac{7}{12}$

13.  $\frac{3}{8} \cdot \frac{5}{10} \cdot \frac{7}{2}$

14.  $\frac{4}{13} + \frac{3}{26} + \frac{2}{5}$