

Intro to college math: Chapter 0.2

Fraction Operations

- * Multiplication of fractions — multiply the numerators together and then multiply the denominators together.

$$\frac{2}{3} \cdot \frac{3}{4} = \frac{6}{12}$$

- * Reciprocal — is flipping the fraction upside down; in other words, the numerator becomes the denominator and the denominator becomes the numerator.

$$\frac{3}{4} \rightarrow \frac{4}{3} \text{ is the reciprocal}$$

- * Division of fractions — instead of dividing fractions, we take the reciprocal of the 2nd fraction and then multiply it by the first fraction.

$$\frac{2}{3} \div \frac{1}{5} \rightarrow \frac{2}{3} \cdot \frac{5}{1} = \frac{10}{3}$$

- * Addition and subtraction for fractions — if the denominators are the same for the fractions, then we just add or subtract the numerators and the denominator stays the same.

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

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

- * Least common denominator — the smallest number that all the denominator can divide into evenly.

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

12 is the least common denominator

$$4 \cdot 1 = 4$$

$$3 \cdot 1 = 3$$

$$4 \cdot 2 = 8$$

$$3 \cdot 2 = 6$$

$$4 \cdot 3 = 12$$

$$3 \cdot 4 = 12$$

* Every one of the following problems can be solved on the calculator.*

1. Simplify and reduce.

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

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

$$-\frac{6}{4} = -\frac{3}{2}$$

Since denominators are the same, we just add the numerators

To solve on Calculator:

1. Press fraction button.



2. Type in (-) which is at bottom of calculator, followed by the number that on top of fraction.

3. Then press the down arrow, which is the oval looking button on the right side.



This one.

4. Then type in number on bottom of fraction.

5. Then press over button, which is on oval looking button.



This one.

6. Press minus button on left.



7. Then press fraction button.



8. Type in number on the top of fraction

9. Press down arrow, which is on oval button.



This one.

10. Then type in number on bottom of fraction.

11. Press over (right) button.



this one

12. Press enter.

2. Add or subtract and write your answer in simplified form.

$$\frac{1}{4} - \left(-\frac{1}{8}\right)$$

** 2 negatives beside each other make a (+)*

$$\frac{1}{4} + \frac{1}{8}$$

$$\frac{1}{4} \cdot \frac{2}{2} = \frac{2}{8}$$

$$\frac{2}{8} + \frac{1}{8}$$

** find common denominator*

$$\frac{2+1}{8} = \boxed{\frac{3}{8}}$$

To solve on Calculator:

1. Press fraction button. $\left[\frac{\Box}{\Box}\right]$
2. Type in number that's on top of fraction.
3. Then press the down arrow, which is the oval looking button on the right side. \downarrow
4. Then type in number on bottom of fraction.
5. Then press over button, which is on oval looking button. $\frac{\Box}{\Box}$
6. Press minus button on left. $[-]$
7. Press parenthesis button. $[(]$
8. Press (-) button.
9. Then press fraction button.
10. Type in number on the top of fraction
11. Press down arrow, which is on oval button.
12. Then type in number on bottom of fraction.
13. Press over (right) button.
14. Press parenthesis button. $[)]$
15. Press enter.

3. Add or subtract and write your answer in simplified form.

$$-\frac{1}{2} - \left(-\frac{4}{5}\right)$$

** 2 negatives beside each other make a (+)*

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

$$-\frac{1}{2} \cdot \frac{5}{5} = -\frac{5}{10} + \frac{4}{5} \cdot \frac{2}{2} = \frac{8}{10}$$

** find common denominator*

$$-\frac{5}{10} + \frac{8}{10}$$

$$\frac{-5+8}{10} = \boxed{\frac{3}{10}}$$

** can solve with calculator*

4. Add or subtract and write your answer in simplified form.

$$-\frac{3}{4} - \left(-\frac{5}{6}\right)$$

** 2 negatives beside each other make a (+)*

$$-\frac{3}{4} + \frac{5}{6}$$

$$-\frac{3}{4} \cdot \frac{3}{3} = -\frac{9}{12} + \frac{5}{6} \cdot \frac{2}{2} = \frac{10}{12}$$

$$-\frac{9}{12} + \frac{10}{12}$$

$$\frac{-9+10}{12} = \boxed{\frac{1}{12}}$$

** find common denominator*

** can solve with calculator*

5. Multiply.

$$\left(-\frac{5}{6}\right) \cdot \left(-\frac{6}{5}\right)$$

$$\frac{(-5) \cdot (-6)}{(6) \cdot (5)}$$

$$\frac{30}{30} = \boxed{1}$$

multiply numerators together
multiply denominators together

on calculator

$$\left(-\frac{5}{6}\right) \cdot \left(-\frac{6}{5}\right)$$

6. Multiply and make sure your answer is written in lowest terms.

$$\left(-\frac{5}{6}\right) \cdot 18$$

$$\frac{(-5) \cdot (18)}{6}$$

$$\frac{-90}{6} = \boxed{-15}$$

7. Expand and simplify.

$$\left(-\frac{5}{8}\right)^2$$

$$\left(-\frac{5}{8}\right) \cdot \left(-\frac{5}{8}\right)$$

$$\frac{(-5) \cdot (-5)}{8 \cdot 8}$$

$$\boxed{\frac{25}{64}}$$

To type in calculator:

1. Press parenthesis button. $($
2. Press (-) button.
3. Press fraction button. $\frac{\Box}{\Box}$
4. Type in numerator
5. Press down button.
6. Type in denominator.
7. Press over button to the right.
8. Press the x^2
9. Press enter.

Tip: When you see an exponent next to a number, that means to write down the number the amount of times the exponent says + then multiply.

ex.) 3^2
 $3 \cdot 3 = 9$

4^3
 $4 \cdot 4 \cdot 4 = 64$

8. Expand and simplify.

$$\left(-\frac{2}{5}\right)^2 \cdot \left(\frac{4}{5}\right)^2$$

$$\left(-\frac{2}{5}\right)\left(-\frac{2}{5}\right)\left(\frac{4}{5}\right)\left(\frac{4}{5}\right)$$

$$\frac{(-2)(-2)(4)(4)}{(5)(5)(5)(5)}$$

$$\boxed{\frac{64}{625}}$$

9. Find the quotient by replacing the divisor with its reciprocal and multiplying.

$$2 \div \frac{8}{7}$$

$$2 \cdot \frac{7}{8}$$

$$\frac{2 \cdot 7}{8}$$

$$\frac{14}{8} = \boxed{\frac{7}{4}}$$

To type in calculator:
Leave as a division problem.

1. Type the number
2. Press \div
3. Press fraction button $\frac{\Box}{\Box}$
4. Type in numerator
5. Press down button
6. Type in denominator
7. Press over button
8. Press enter

10. Find the quotient by replacing the divisor with its reciprocal and multiplying.

$$\frac{5}{8} \div \frac{1}{4}$$

$$\frac{5}{8} \cdot \frac{4}{1}$$

$$\frac{5 \cdot 4}{8 \cdot 1}$$

$$\frac{20}{8} = \boxed{\frac{5}{2}}$$