

1/18 Fractions

Tuesday, January 18, 2022 12:34 PM

Quick Review:

1 Order of Operations:

Calculate:

$$\begin{aligned} (6+2^2)^2 - 15 \div 3 \times 2 &= (6+4)^2 - 15 \div 3 \times 2 \\ &= 10^2 - 15 \div 3 \times 2 \\ &= 100 - 15 \div 3 \times 2 \\ &= 100 - 5 \times 2 = 100 - 10 = 90 \end{aligned}$$

2. Feet \leftrightarrow inches

How many inches in 5'7"?

$$5 \times 12 + 7 = 60 + 7 = 67 \text{ inches}$$

How many feet + inches in 80 inches?

$$\begin{array}{r} 6 \\ 12 \overline{) 80} \\ 72 \\ \hline 8 \end{array}$$

$$\boxed{\text{ans: } 6'8''}$$

Calculator: $80 \div 12 = 6.66\ldots$

$$80 = (6 \times 12) + 8$$

$$80 - (12 \times 6) = 8$$

3. Rounding

Round 74523.281 to the nearest hundreds

$$74500$$

Round 24.3879 to the nearest hundredths.

$$24.39$$

4. Averages

Find the average of 4, 16, 2, and 5.

$$\text{Average} = \frac{\text{Sum}}{\text{Count}} = \frac{4+16+2+5}{4} = \frac{27}{4} = 6.75$$

If the average of three numbers is 20,

then what is the total?

$$\text{Total (Sum)} = \text{Average} \times \text{Count}$$

$$\text{Total} = 20 \times 3 = 60$$

If 2, 3, 4, and an unknown number together has an average of 10, what is the unknown?

$$\frac{\text{Sum}}{\text{Total}} = \text{Average} \times \text{Count} = 10 \times 4 = 40$$

$$2+3+4+\text{unknown} = 40$$

$$\text{unknown} = 40 - (2+3+4) = 40-9 = 31$$

TODAY:

1.

Math 1435 Math Fundamentals

Fractions

2.

Fractions- explanation

2.

Fractions- explanation



- A fraction is a part of a whole number. Take 1 piece of a pie that has been divided equally into 8 parts. You now have $1/8^{\text{th}}$ of the pie!
- Imperial measurements work the same way. $\frac{3}{4}$ = (1" equally divided into 4 parts – 3 of those parts represents $\frac{3}{4}$ ")
- Some terminology
 - Numerator – the number on top of the line.
 - Denominator – the number below the line.
 - Common denominator – A number in which all of the denominators of a group of fractions will divide evenly.

numerator
denominator

~~numerator~~
~~denominator~~

3.

Adding Fractions

- Add the fractions $\frac{1}{2} + \frac{3}{7}$

$$\frac{1 \times 7}{2 \times 7} + \frac{3 \times 2}{7 \times 2} = \frac{7}{14} + \frac{6}{14} = \frac{7+6}{14} = \frac{13}{14}$$

- Step 1 - Find a common denominator.

$\frac{1}{2}$ and $\frac{3}{7}$ have a common denominator of 14 ($2 \times 7 = 14$) or ($7 \times 2 = 14$).

- Step 2 - What you do to the bottom (denominator), you must do to the top (numerator).

$$\frac{1 \times 7}{2 \times 7} = \frac{7}{14} \quad \frac{3 \times 2}{7 \times 2} = \frac{6}{14} \quad \frac{7}{14} + \frac{6}{14} = \frac{13}{14}$$

What do you do if you have more than 2 fractions?

- Add the following fractions: $\frac{1}{4} + \frac{1}{2} + \frac{1}{7}$

The common denominator is 28.

$$\frac{1 \times 7}{4 \times 7} = \frac{7}{28} + \frac{1 \times 14}{2 \times 14} = \frac{14}{28} + \frac{1 \times 4}{7 \times 4} = \frac{4}{28}$$

Therefore; $\frac{7}{28} + \frac{14}{28} + \frac{4}{28} = \frac{25}{28}$

$$\frac{1}{4} + \frac{1}{2} + \frac{1}{7}$$

$$4 \times 2 \times 7 = 56$$

$$\frac{1 \times 2 \times 7}{4 \times 2 \times 7} + \frac{1 \times 4 \times 7}{2 \times 4 \times 7} + \frac{1 \times 4 \times 2}{7 \times 4 \times 2} = \frac{14}{56} + \frac{28}{56} + \frac{8}{56} = \frac{14+28+8}{56} = \frac{50}{56} = \frac{25}{28} = \frac{25 \times 2}{28 \times 2} = \frac{50}{56}$$

4.

Subtracting Fractions

Subtracting Fractions

- Same rules apply for subtracting fractions as for adding fractions.
- First find the lowest common denominator.
- Second, do to the numerator what you did to the denominator.
- Third, subtract the numerators.
- Consider this problem. $\frac{1}{2} - \frac{3}{7} =$
 - The common denominator will be 14
 - $\frac{1 \times 7}{2 \times 7} = \frac{7}{14}$
 - $\frac{3 \times 2}{7 \times 2} = \frac{6}{14}$
 - Therefore $\frac{7}{14} - \frac{6}{14} = \frac{1}{14}$

$$\begin{aligned}\frac{1}{2} - \frac{3}{7} &= \frac{1}{2} \times \frac{7}{7} - \frac{3}{7} \times \frac{2}{2} \\ \text{Common denom} &= 2 \times 7 = 14 \\ &= \frac{7}{14} - \frac{6}{14} \\ &= \frac{7-6}{14} = \frac{1}{14}\end{aligned}$$

Practice:

$$1: \quad \frac{1}{8} + \frac{1}{6} = \frac{7}{24}$$

$$\text{Common denom} = 8 \times 6 = 48$$

$$\frac{1}{8} \times \frac{6}{6} + \frac{1}{6} \times \frac{8}{8} = \frac{6}{48} + \frac{8}{48} = \frac{14}{48} = \frac{7}{24}$$

$$2: \quad \frac{1}{6} - \frac{1}{8} = \frac{1}{24}$$

$$2: \quad \frac{2}{7} + \frac{5}{8} = \frac{51}{56}$$

$$\text{Comm. denom} = 7 \times 8 = 56$$

$$\frac{2}{7} \times \frac{8}{8} + \frac{5}{8} \times \frac{7}{7} = \frac{16}{56} + \frac{35}{56} = \frac{51}{56}$$

$$3: \quad \frac{5}{8} - \frac{2}{7} = \frac{19}{56}$$

$$\frac{5}{8} \times \frac{7}{7} - \frac{2}{7} \times \frac{8}{8} = \frac{35}{56} - \frac{16}{56} = \frac{19}{56}$$

$$6: \quad \frac{7}{16} + \frac{8}{17} = \underline{\hspace{2cm}}$$

$$6: \quad \frac{7}{16} - \frac{8}{17} = \underline{\hspace{2cm}}$$

5.

Adding & Subtracting mixed fractions

 ← mixed fraction

- In order to add or subtract mixed fractions (2-3/4). We must first change the mixed fraction into an "Improper fraction".
- Improper fraction** – A fraction where the numerator is the same or larger than the denominator.
- To change a mixed fraction into an improper fraction, we must first multiply the whole number by the denominator, then add the product to the numerator. 2-3/4 becomes $\frac{(2 \times 4) + 3}{4} = \frac{11}{4}$

Practice:

1:

$$1\frac{6}{13} = \frac{19}{13}$$

4:

$$5\frac{1}{3} = \frac{16}{3}$$

$$\frac{1 \times 13 + 6}{13} = \frac{13+6}{13} = \frac{19}{13}$$

4:

$$\frac{2}{4} + 2\frac{2}{3} = \frac{19}{6}$$

10:

$$1 + 2\frac{3}{4} = \frac{15}{4}$$

$$\frac{2}{4} + \frac{2 \times 3 + 2}{3} = \frac{2}{4} + \frac{8}{3} = \frac{2 \times 3 + 8 \times 4}{4 \times 3} = \frac{38}{12}$$

C.D. = $4 \times 3 = 12$

$$= \frac{6}{12} + \frac{32}{12} = \frac{38}{12} = \frac{19}{6}$$

$$\left| \begin{array}{l} 1 + \frac{2 \times 4 + 3}{4} = 1 + \frac{11}{4} \\ = \frac{1}{1} + \frac{11}{4} = \frac{4+11}{4} = \frac{15}{4} \end{array} \right.$$

5:

$$2\frac{2}{5} - 2\frac{2}{7} = \underline{\quad}$$

9:

$$1\frac{2}{9} - 2 = \underline{\quad}$$

6.

Multiplying Fractions

• Multiplying a fraction by a fraction

1. Multiply the numerators to find its product.
2. Multiply the denominators to find its product.
3. Reduce the answer to its lowest terms.

$$\frac{4}{5} \times \frac{3}{4} = \frac{4 \times 3}{5 \times 4} = \frac{12}{20} \quad \text{reduced to; } \frac{3}{5} \quad (12/4) \quad (20/4)$$

Practice: simplifying fractions

1:

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

3:

$$\frac{9}{12} = \frac{3}{4}$$

10:

$$\frac{5}{15} = \frac{1}{3}$$

2:

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

5:

$$\frac{6}{12} = \frac{1}{2}$$

8:

$$\frac{5}{10} = \frac{1}{2}$$

7.

Multiplying Fractions - example

- Cancellation: simplifies the multiplication process by dividing any one denominator and any one numerator evenly by the same number.
 - Example:
- $$\frac{15}{240} = \frac{3 \times 5 \times 1}{4 \times 6 \times 10} = \frac{\cancel{3}^1 \times \cancel{5}^1 \times 1}{\cancel{4}^2 \times \cancel{6}^2 \times \cancel{10}^2} = \frac{1 \times 1 \times 1}{4 \times 2 \times 2} = \frac{1}{16}$$
- 1. The 6 and 3 can be divided by 3 evenly.
 - 2. The 5 and 10 can be divided by 5 evenly.
 - $\frac{1 \times 5 \times 1}{4 \times 2 \times 10} =$
 - $\frac{1 \times 1 \times 1}{4 \times 2 \times 2} = \frac{1}{16}$

8.

Multiplying fractions by a whole number

Multiply a fraction by a whole number

- First change the whole number into a improper fraction ($2 = \frac{2}{1}$).
- Change any mixed fractions into improper fractions.
- Multiply the numerators to find its product.
- Multiply the denominators to find its product.
- Reduce the answer to its lowest terms.

Consider this:

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

Practice

$$\text{11: } \frac{3}{8} \times \frac{6}{9} = \frac{1}{4}$$

$$\frac{3}{8} \times \frac{6}{9} = \frac{3}{4 \times 2} \times \frac{(2 \times 3)}{3 \times 3} = \frac{1}{4}$$

4:

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

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

9.

Dividing Fractions

$$\frac{3}{4} \rightarrow \text{reciprocal} = \frac{4}{3}$$

$$\frac{27}{13} \rightarrow \frac{13}{27}$$

- The division of fractions requires us to use the reciprocal of a fraction than multiply the inverted fraction by the unchanged fraction.

- To invert a fraction, simply exchange the numerator for the denominator in one of the fractions of the problem.

- When inverting $\frac{1}{2}$ changes to $\frac{2}{1}$, $\frac{1}{3}$ changes to $\frac{3}{1}$ etc.

Example:

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

- All mixed fractions and whole numbers are changed to improper fractions

$$\frac{11+1}{4} \quad \frac{3}{3}$$

- Change the \div sign to a \times sign and invert the second number.

$$\frac{11}{4} \times \frac{3}{1} = \frac{33}{4}$$

- Reduce the improper fraction to its lowest terms

$$\frac{33}{4} = 8\frac{1}{4}$$

Practice

11:

$$\frac{3}{8} \div \frac{6}{9} = \frac{9}{16}$$

$$\frac{3}{8} \times \frac{9}{16} = \frac{9}{16}$$

$$1: \frac{10}{12} \div \frac{5}{10} = \frac{5}{3} = 1\frac{2}{3}$$

$$\frac{10}{12} \times \frac{10}{5} = \frac{5}{3} = 1\frac{2}{3}$$

$$\frac{\cancel{10}}{\cancel{12}} \times \frac{10}{\cancel{5}} = \frac{(5 \times 1)}{(\cancel{1} \times \cancel{2} \times \cancel{3})} \times \frac{10}{\cancel{5}} = \frac{5}{3}$$

$$10: \frac{8}{6} \div \frac{5}{3} = \frac{4}{5}$$

$$\frac{4}{\cancel{8}} \times \frac{\cancel{3}}{5} = \frac{4 \times 1}{1 \times 5} = \frac{4}{5}$$

10.

Converting Between Decimals and Fractions

- Fractions to decimals
- Simply divide the numerator (top number) by the denominator (bottom number).
- Change $\frac{5}{8}$ into a decimal.
- $5 \div 8 = .625$

$$\text{Calculator: } 5 \div 8 = 0.625$$

Mixed fraction to a decimal

- When dealing with a mixed fraction, the whole number does not change, we divide the numerator of the fraction by the denominator to find the decimal.
- Change $2\frac{3}{4}$ into a decimal.
- The 2 remains the on the left side of the decimal and the $\frac{3}{4}$ is changed into a decimal.
- $2 + (\frac{3}{4}) = 2.75$

$$2 + \overline{0.75} = 2.75$$

$$2\frac{3}{4} = \frac{8 \times 4 + 3}{4} = \frac{11}{4} = 2.75$$

$$11 \div 4 = 2.75$$

Practice:

Example: Convert $\frac{3}{4}$ to a Decimal

$$0.75$$

Express $\frac{11}{16}$ as a decimal

$$0.6875$$

11.

Converting Between fractions and Decimals

$$0.3 = \frac{3}{10} \quad 0.32 = \frac{32}{100}$$

$$0.0567 = \frac{567}{1000} \quad 0.32 = \frac{8}{25}$$

- Changing from a decimal to a fraction
- The key to changing a decimal to a fraction is to understand the columns to the right of the decimal.
- .625 – the 6 is in the tenths column, the 2 is in the hundredths column and the 5 is in the thousandths column. Since the last number is in the thousandths column, we simply write the fraction as follows: $\frac{625}{1000}$
- Now we have to reduce the fraction to its lowest terms.
- $\frac{625 \div 25}{1000 \div 25} = \frac{25}{400} = \frac{25 \div 5}{400 \div 5} = \frac{5}{8}$
- Changing from a decimal with whole number to a fraction
- The whole number (the number to the left of the decimal) remains a whole number. The decimal is treated as above.
- $4.625 = 4\frac{5}{8}$

$$3.\overline{32} = \frac{3 \times 25 + 8}{25} = \frac{83}{25}$$

Practice

Example: Convert 0.75 to a fraction

$$\frac{75}{100} = \frac{15}{20} = \frac{3}{4}$$

$$\frac{1}{2} = 0.5$$

$$\frac{1}{3} = 0.33333\ldots$$

$$\frac{1}{4} = 0.25$$

$$\frac{1}{3} = 0.6666\ldots$$

$$\frac{3}{4} = 0.75$$

Example: Convert 2.35 to a fraction

$$0.35 = \frac{35}{100} = \frac{7}{20}$$

$$2.35 = 2\frac{7}{20}$$

12.

Fractions - Review

- Review:
- Addition of fractions
 1. Find the common denominator.
 2. Convert fractions to equivalent fractions with the common denominator.
 3. Add the numerators.
 4. Reduce the product to its lowest terms.
- Subtraction of fractions
 1. Find the common denominator.
 2. Convert fractions to equivalent fractions with the common denominator.
 3. Subtract the numerators.
 4. Reduce the product to its lowest terms.

13.

Fractions – review page 2

- Review:
 - Multiplication of fractions
 1. Multiply the numerators.
 2. Multiply the denominators.
 3. Reduce the product to its lowest terms.
 - Division of fractions
 1. Invert the fraction you are dividing by and change the division symbol to a multiplication symbol.
 2. Multiply the numerators.
 3. Multiply the denominators.
 4. Reduce the product to its lowest terms.

Before you leave:

Test 1 coming up on week 4

questions on contact until 1:2

test 1 coming up on week 4

- questions on content weeks 1 - 3

- see details and practice on eConestoga Shell (Test 1)

- more details next week.

More Practice Problems on Fractions on eConestoga (Week 1 & Week 2)