

What is a fraction?

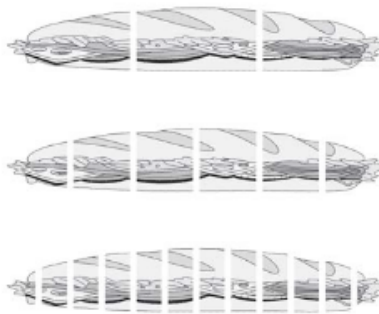
Explanation:

Vocabulary: *Numerator, Denominator*
Rational Number
Equivalent Fractions
Fraction in Lowest Terms
Greatest Common Factor
Mixed Numbers
Improper Fractions
Common Denominator
Least Common Denominator

Fractions

You decide to have some friends over to watch videos. After the first movie, you call the local sub shop to order three giant submarine sandwiches. When the subs arrive you pay the bill and everyone agrees to reimburse you, depending on how much they eat.

Because some friends are hungrier than other, you cut one sub into three equal (large) pieces, a second sub into six equal (medium) pieces, and the third sub into twelve equal (small) parts.



- Because the first sub is divided into three large *equal* pieces, each piece represents a fractional part of the whole sub. Write a fraction that represents what part of the whole sub each large piece represents.
 - What fraction of the sub does each medium piece represent? Explain.
 - What fraction of the sub does each small piece represent? Explain.

2.
 - a. If you eat five small pieces, what fractional part of the whole sub did you eat? Explain.

 - b. What is the denominator of this fraction? How many equal segments does the fraction indicate the sub is divided into?

 - c. What is the numerator of this fraction? What does this number represent?

3.
 - a. Suppose a friend is very hungry and he eats all three large pieces of the sub. What fraction represents the amount he ate?

 - b. What is the value of the fraction in part a? Explain.

 - c. If $\frac{6}{6}$ represents how much of the medium sub that was eaten, what is the value of the fraction?

 - d. In general, what is the value of a fraction whose numerator and denominator are equal but non-zero?

4.
 - a. If you didn't eat any of the large pieces of the first sub, what fraction represents the amount of the first sub that you ate.

 - b. What is the value of the fraction in part a?

 - c. If $\frac{0}{12}$ represents the amount that you ate of the third sub, what does the numerator indicate?

 - d. What is the value of the fraction $\frac{0}{12}$?

 - e. In general, what is the value of a fraction whose numerator is zero?

5. As you are cutting the subs, you notice that two medium pieces placed end-to-end measure the same as one large piece. Therefore, $\frac{2}{6}$ of the sub represents the same portion as $\frac{1}{3}$.
- How many small pieces represent the same portion as one large piece?
 - What fraction of the sub does the number of small pieces in part a. represent?
6. a. Divide the numerator and the denominator of $\frac{2}{6}$ by 2 to obtain an equivalent fraction.
- b. Multiply the numerator and denominator of $\frac{1}{3}$ by 4 to obtain an equivalent fraction.
7. Write the given fraction as an equivalent fraction with the given denominator.
- $\frac{3}{10} = \frac{?}{20}$
 - $\frac{4}{5} = \frac{?}{30}$
 - $\frac{7}{11} = \frac{?}{374}$
 - $\frac{8}{9} = \frac{?}{72}$
8. a. What whole number is a factor of both the numerator and denominator of $\frac{1}{3}$?
- b. What is the largest whole number that is a factor of both the numerator and denominator of $\frac{8}{12}$?
- c. What is the largest whole number that is a factor of both the numerator and the denominator of $\frac{6}{8}$?
9. Reduce the following fractions to equivalent fractions in lowest terms.
- $\frac{6}{8}$
 - $\frac{6}{15}$
 - $\frac{7}{8}$
 - $\frac{22}{165}$

10. a. All of the first (large pieces) and second (medium pieces) subs are eaten and only one small piece of the third sub (small pieces) is left. Represent the amount eaten as the sum of a whole number and a fraction.
- b. Suppose all three subs were cut into twelve equal parts. How many twelfths were eaten if only one piece was left, as in part a? Write your answer in words and as a single fraction.
- c. Is the sum in part a equivalent to the fraction in part b? Explain.

11. Write the following mixed numbers as improper fractions in lowest terms.

a. $1\frac{5}{8}$

b. $4\frac{9}{12}$

c. $5\frac{6}{10}$

12. Write the given improper fractions as mixed numbers in lowest terms.

a. $\frac{5}{2}$

b. $\frac{24}{10}$

c. $\frac{21}{7}$

d. $\frac{61}{61}$

13. Suppose one group of friends ate four medium pieces and another group ate ten small pieces.

a. What fractional part of the sub did the first group eat?

b. What fractional part of the sub did the second group eat?

c. Using the graphics display of the subs at the beginning of this activity to help determine which group ate more.

14. Write $\frac{4}{6}$ as an equivalent fraction with a denominator of 12.

15. Which fraction is larger, $\frac{5}{8}$ or $\frac{3}{4}$?

16. a. Write $\frac{1}{6}$ and $\frac{3}{8}$ as equivalent fractions, each with a denominator of 24.

b. Use the result from part a to compare $\frac{1}{6}$ and $\frac{3}{8}$

17. Compare the following fractions and determine which is larger.

a. $\frac{3}{5}$ and $\frac{1}{2}$

b. $\frac{1}{6}$ and $\frac{3}{8}$

c. $\frac{1}{6}$ and $\frac{3}{8}$

Exercises:

Determine the missing number.

1. $\frac{2}{3} = \frac{?}{12}$

2. $\frac{3}{4} = \frac{?}{20}$

Reduce the given fraction to an equivalent fraction in lowest terms.

3. $\frac{9}{15}$

4. $\frac{8}{28}$

Use the inequality symbols $<$ and $>$ to compare the following fractions

5. $\frac{5}{12}$ and $\frac{1}{3}$

6. $\frac{3}{7}$ and $\frac{2}{5}$

Reduce the following improper fractions to lowest terms and convert to mixed numbers.

7. $\frac{5}{3}$

8. $\frac{21}{14}$

Convert the following mixed numbers to improper fractions in lowest terms.

9. $3\frac{3}{8}$

10. $5\frac{6}{8}$

11. You and your sister ordered two individual pizzas. You ate $\frac{3}{4}$ of your pizza and your sister ate $\frac{5}{8}$ of her pizza. Who ate more pizza?

12. You and your friend are painting a house. While you painted $\frac{2}{12}$ of the house, your friend painted $\frac{3}{18}$ of the house. Who painted more?

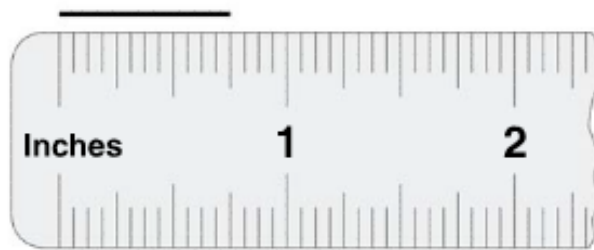
13. In a basketball game, you made 4 baskets out of 12 attempts. Your teammate made 3 baskets out of 8 attempts.

a. What fraction of your attempted shots did you make?

b. What fraction of your teammate's attempted shots did she make?

c. Who was the more accurate shooter?

14. An Ivy League college accepts 5 students for every 100 that apply. What fraction of applicants is accepted? Write your result in lowest terms.
15. You have two pieces of lumber. One piece measures 6 feet long and the second piece measures $\frac{25}{4}$ feet long.
- Write $\frac{25}{4}$ as a mixed number.
 - Write 6 as an improper fraction with a denominator of 4.
 - Which piece is longer? Explain using math.
16. Measuring with rulers provides an opportunity to test your understanding of fractions. Use the following graphic of a ruler to answer the following questions about measuring the line segment drawn above the ruler.



- Look at the ruler and determine the number of $\frac{1}{4}$ - inch segments in one inch.
- How many $\frac{1}{4}$ - inch segments did the given line measure?
- How long is the given line segment (in inches)?
- Measure the given line segment in $\frac{1}{8}$ - inch units.
- Finally, measure the given line segment in $\frac{1}{16}$ - inch units.
- Explain why the three fractional answers in parts c, d, and e are equivalent.
- Another line segment measures $\frac{2}{3}$ inch. Is it longer or shorter than the given line segment? Explain using math.