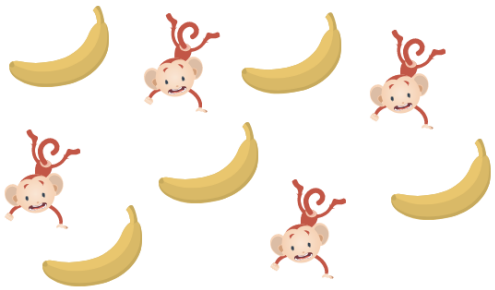
A ratio compares two different quantities.

For example, those two quantities could be monkeys and bananas:



Notice that there are 4 monkeys and 5 bananas.

Here are a few different ways we can describe **the ratio of monkeys to bananas**:

1. There are 4 monkeys for every 5 bananas.

2. The ratio of monkeys to bananas is 4 to 5.

3. The ratio of monkeys to bananas is $4 : 5$.

Order matters in ratios. Here are a few different ways to describe **the ratio of bananas to monkeys**:

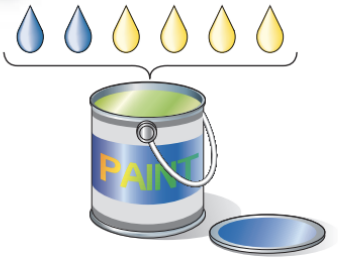
1. There are 5 bananas for every 4 monkeys .

2. The ratio of bananas to monkeys is 5 to 4.

3. The ratio of bananas to monkeys is $5 : 4$.

How are ratios used in paint mixtures?

The diagram shows a gallon of paint that is made using 2 parts blue paint and 4 parts yellow paint.



a. Which combination of paint would you use to make a smaller amount of the same shade of paint? Explain.

Combination A

Combination B

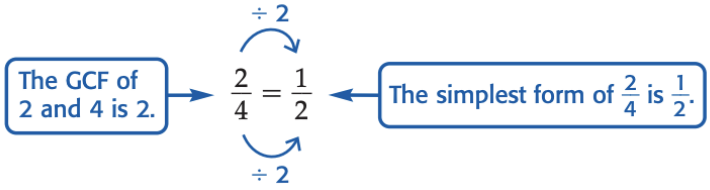
b. Suppose you want to make the same shade of paint as the original mixture? How many parts of yellow paint should you use for each part of blue paint?

WRITE RATIOS AS FRACTIONS IN SIMPLEST FORM

A **ratio** is a comparison of two numbers by division. If a gallon of paint contains 2 parts blue paint and 4 parts yellow paint, then the ratio comparing the blue paint to the yellow paint can be written as follows.

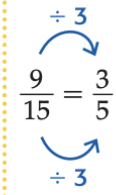
2 to 4 2:4 $\frac{2}{4}$

Recall that a fraction bar represents division. When the first number being compared is less than the second, the ratio is usually written as a fraction in simplest form.



Example 1 Write Ratios as Fractions

Express the ratio *9 goldfish out of 15 fish* as a fraction in simplest form.



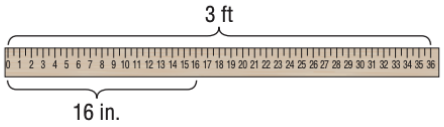
Divide the numerator and denominator by the GCF, 3.

The ratio of goldfish to fish is 3 to 5. This means that for every 5 fish, 3 of them are goldfish.

When writing a ratio involving measurements, both quantities should have the same unit of measure.

Example 2 Write Ratios as Fractions

Express the ratio *3 feet to 16 inches* as a fraction in simplest form.



$$\frac{3 \text{ feet}}{16 \text{ inches}} = \frac{36 \text{ inches}}{16 \text{ inches}}$$ Convert 3 feet to inches.

$$= \frac{9 \text{ inches}}{4 \text{ inches}}$$ Divide the numerator and denominator by the GCF, 4.

Written in simplest form, the ratio is 9 to 4.

Concept Check Give an example of a ratio in simplest form.

Express each ratio as a fraction in simplest form.

4. 4 goals in 10 attempts

5. 15 dimes out of 24 coins

6. 10 inches to 3 feet

7. 5 feet to 5 yards

Express each ratio as a fraction in simplest form.

16. 6 ladybugs out of 27 insects

17. 14 girls to 35 boys

18. 18 cups to 45 cups

19. 12 roses out of 28 flowers

20. 7 cups to 9 pints

21. 9 pounds to 16 tons

22. 11 gallons to 11 quarts

23. 18 miles to 18 yards

24. 15 dollars out of 123 dollars

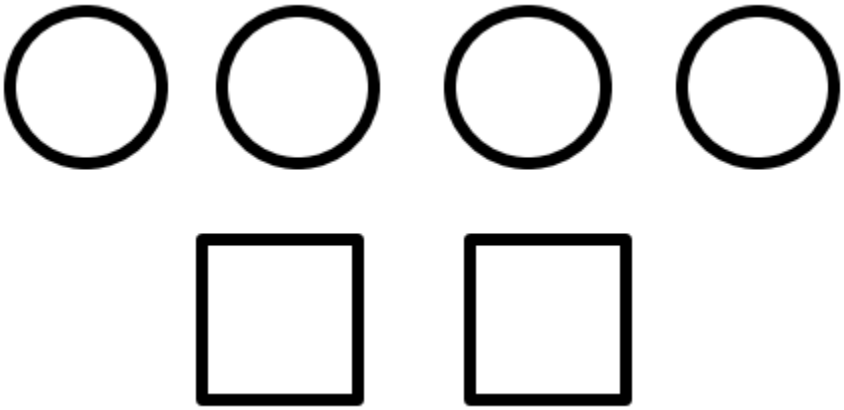
25. 17 rubies out of 118 gems

26. 155 apples to 75 oranges

27. 321 articles in 107 magazines

1) The ratio of red to white flowers is 2:5. If both the number of red and white flowers are doubled, what is the new ratio of red to white flowers?

2) Keeping the ratio the same, how many circles and squares do you need to add to have a total of 12 (circles plus squares)?



Circles: Squares:

3) Explain how you solved problem 3. Will the same procedure work to get a total of 15 (circles plus squares)? How many would you add for 15?

Circles: Squares:

The table shows how many of each type of snack are found in a vending machine.

Snack	Numbers
Sweet	15
Salty	7
Gum	2

What is the ratio of salty snacks to sweet snacks in the vending machine?

Choose 1 answer:

(A) 15 for every 7

(B) 7 for every 2

(C) 2 for every 15

(D) 7 for every 15

For the perfect cup of hot cocoa, Eva uses 3 scoops of hot cocoa mix, 10 miniature marshmallows, and 8 ounces of water.

What is the ratio of scoops of hot cocoa to miniature marshmallows?

Choose 1 answer:

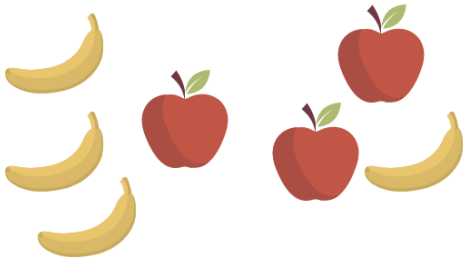
(A) 3 to 8

(B) 3 to 10

(C) 8 to 3

(D) 3 to 18

What is the ratio of apples to bananas?



Choose 1 answer:

- (A) $3 : 4$
- (B) $4 : 3$
- (C) $3 : 7$
- (D) $7 : 3$

The table shows the number of students who ate different foods for lunch.

Food	Students
Mac and cheese	6
Burger	7
Pizza	13
Salad	4

What is the ratio of students who ate pizza to students who ate mac and cheese?

Choose 1 answer:

(A) $6 : 13$

(B) $6 : 30$

(C) $13 : 6$

(D) $13 : 17$

Erin loves to play sports! She has earned 3 tennis trophies, 4 basketball trophies, 7 soccer trophies, and 1 volleyball trophy.

What is the ratio of Erin's tennis trophies to soccer trophies?

Choose 1 answer:

(A) $3 : 7$

(B) $4 : 7$

(C) $7 : 4$

(D) $3 : 12$

Select three ratios that are equivalent to $7 : 6$.

Choose 3 answers:

- (A) $12 : 14$
- (B) $21 : 18$
- (C) $42 : 36$
- (D) $63 : 54$
- (E) $84 : 62$

Select three ratios that are equivalent to $5 : 2$.

Choose 3 answers:

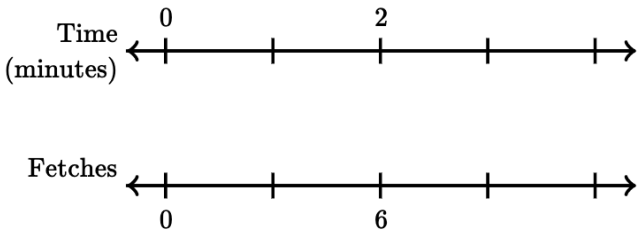
- (A) $2 : 5$
- (B) $10 : 4$
- (C) $20 : 50$
- (D) $35 : 14$
- (E) $55 : 22$

Select two ratios that are equivalent to $27 : 9$.

Choose 2 answers:

- (A) $3 : 1$
- (B) $9 : 3$
- (C) $6 : 3$
- (D) $9 : 6$
- (E) $12 : 3$

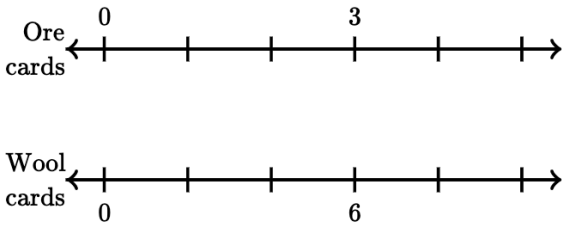
The double number line shows that in 2 minutes, Pogo the dog can fetch a frisbee 6 times.



Based on the ratio shown in the double number line, how many times will Pogo fetch the frisbee in 4 minutes?

_____ times

David and Jillian are playing a board game together. Jillian wants to trade her wool cards for David's ore cards. The double number line shows that David will trade 3 ore cards to Jillian for 6 wool cards.



Based on the ratio shown in the double number line, how many wool cards does Jillian need to trade for 4 ore cards?

wool cards