Exploring Ratios

Quick Review

A **ratio** is a comparison of 2 quantities with the same unit.

Here are 3 squares and 5 circles.

□ □ □ ○ ○ ○ ○ ○

Here are some ways to compare the shapes.

➤ Part-to-Part Ratios
  • squares to circles is 3 to 5 or 3 : 5.
  • circles to squares is 5 to 3 or 5 : 3.

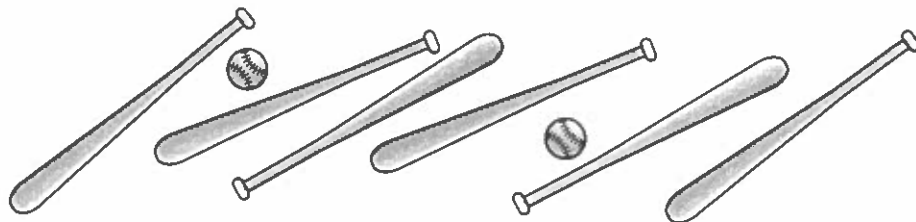> The numbers 3 and 5 are the **terms of the ratio.**

➤ Part-to-Whole Ratios
  • squares to shapes is 3 to 8 or 3 : 8 or $\frac{3}{8}$.
  • circles to shapes is 5 to 8 or 5 : 8 or $\frac{5}{8}$.

> You can write a part-to-whole ratio as a fraction.

Try These

1. Write each ratio in as many ways as you can.

   a) balls to bats _____

   b) bats to balls _____

   c) balls to all toys _____

   d) bats to all toys _____

1. Use the numbers in the box to write each ratio.

   a) odd numbers to even numbers _____

   b) numbers less than 20 to all numbers _____

   c) multiples of 5 to multiples of 7 _____

   d) prime numbers to composite numbers _____

25	16	13	38
17	30	49	3
24	45	7	14

2. Write a word that has each ratio of vowels to consonants.

   a) 2 : 5 _____   b) 1 : 4 _____   c) 4 : 6 _____

3. What is being compared in each ratio?

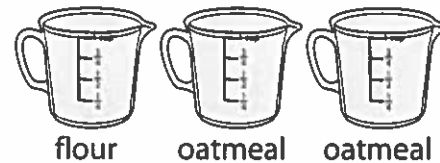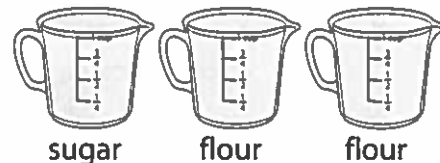   a) 1 to 2 _____

   b) 2 : 6 _____

   c) 2 : 3 _____

   d) $\frac{1}{6}$ _____

   e) $\frac{3}{6}$ _____

   sugar   flour   flour

   flour   oatmeal   oatmeal

4. Draw some acorns and some oak leaves. Write as many ratios as you can for your drawing.

   _____   _____   _____

   _____   _____   _____

Ask 5 people to name the sport they enjoy watching the most.
Write as many ratios as you can to compare the responses.
Tell what each ratio compares.

_____

_____

_____
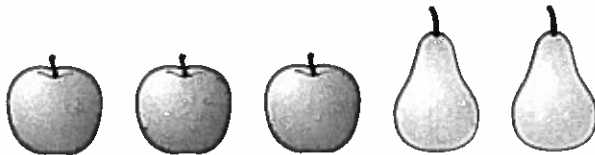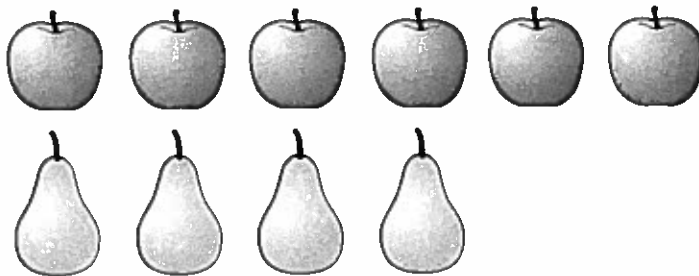
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Equivalent Ratios

Quick Review

> The ratio 3 : 2 means that for every 3 apples there are 2 pears.

The ratio 6 : 4 means that for every 6 apples there are 4 pears.
3 : 2 and 6 : 4 are equal. 3 : 2 and 6 : 4 are **equivalent ratios**.

> You can use a table and patterns
> to find equivalent ratios.
> The numbers in the Apples
> column are multiples of 3.
> The numbers in the Pears
> column are multiples of 2.
> The ratios of apples to pears are:
> 3 : 2, 6 : 4, 9 : 6, 12 : 8, 15 : 10, …

Apples	Pears	Ratio
3	2	3 : 2
6	4	6 : 4
9	6	9 : 6
12	8	12 : 8
15	10	15 : 10

Try These

1. Write 2 equivalent ratios for each ratio.

a) 5 : 3 _____ _____

b) 7 : 4 _____ _____

c) 3 : 9 _____ _____

d) 4 : 11 _____ _____

e) 2 : 6 _____ _____

f) 8 : 5 _____ _____

1. Play this game with a partner.
   You will need 2 sheets of paper and a clock or watch with a second hand.

Ratios	
3 : 7	7 : 4
2 : 5	2 : 9
6 : 3	12 : 11
4 : 3	10 : 15
8 : 6	3 : 8

   ➤ Player A chooses a ratio and writes as many equivalent ratios as she can, as Player B times 30 s.
   ➤ Both players check Player A's ratios.
   Player A gets 1 point for each correct ratio.
   ➤ Players switch roles and play again, using a different ratio.
   ➤ The player with the most points after 5 rounds wins.

2. Write an equivalent ratio with 30 as one of the terms.

   a) 15 : 7 _____   b) 8 : 5 _____   c) 2 : 6 _____   d) 3 : 14 _____

   e) 11 : 5 _____   f) 3 : 2 _____   g) 4 : 10 _____   h) 18 : 15 _____

3. List all the ratios that are equivalent to 4 : 7 and have a first term that is less

   than 25. _____

4. Jillian is planting 4 roses for every 3 daisies in her garden.
   Complete the table to show how many daisies Jillian needs for 8, 12, and 16 roses.
   Write each ratio.

Roses	Daisies	Ratio
4	3	

Stretch Your Thinking

Mr. Tanaka has 56 students in his choir. The ratio of boys to girls is 3 : 4.
How many boys and how many girls are in Mr. Tanaka's choir? Explain.

_____
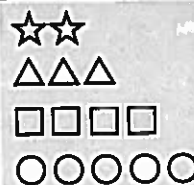
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What is Bigfoot's favorite Christmas song?

Circle the correct answer in the problems below. Then record the corresponding letter of the answer you circled in the rectangles at the bottom to answer the riddle.
Note: The problem numbers match the numbered rectangles.

Using **Diagram 1** for problems 1–5, give the ratio in a to b form:

Diagram 1
☆☆
△△△
☐☐☐☐
○○○○○

① △'s to ☐'s
- **A** 5 to 3
- **D** 3 to 5
- **O** 3 to 4

② ○'s to △'s
- **E** 5 to 3
- **L** 3 to 5
- **C** 3 to 4

③ ☐'s to ☆'s
- **R** 5 to 4
- **I** 4 to 2
- **L** 2 to 5

④ ☆'s to ○'s
- **T** 4 to 2
- **M** 2 to 3
- **C** 2 to 5

⑤ ○'s to ☐'s
- **V** 5 to 4
- **X** 4 to 2
- **B** 4 to 5

A fruit bowl has 1 apple, 3 peaches, 4 plums, 5 apricots, and 6 bananas. For problems 6–11, give the ratio in a:b form:

⑥ Apricots to peaches
- **T** 6:1
- **A** 5:3
- **B** 3:5

⑦ Apples to bananas
- **F** 1:6
- **M** 6:1
- **O** 1:4

⑧ Plums to peaches
- **R** 3:4
- **S** 4:5
- **H** 4:3

⑨ Peaches to apricots
- **F** 6:1
- **M** 5:3
- **T** 3:5

⑩ Bananas to peaches
- **L** 6:1
- **E** 6:4
- **Y** 6:3

⑪ Apples to plums
- **M** 1:3
- **R** 1:4
- **B** 4:1

Mrs. Jensen's class has 25 students. 12 have brown hair, 6 have black hair, 5 have blonde hair, and 2 have red hair.

⑫ What is the ratio of blondes to redheads?
- **M** 5:2
- **I** $\frac{5}{7}$
- **L** 2 to 5

⑬ What is the ratio of black haired students to the total number of students?
- **B** 25:6
- **L** 6:20
- **U** $\frac{6}{25}$

⑭ What is the ratio of blondes, brunettes, and black-haired students to redheads?
- **J** 2 to 25
- **S** 23:2
- **O** 23 to 25

⑮ What is the ratio of brunettes to blondes and redheads?
- **L** 12:7
- **E** $\frac{12}{25}$
- **N** 7 to 12

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
8 6 5 2   10 1 13 11 14 2 15 7   6   8 6 3 11 10   15 3 9 9 15 2   4 8 11 3 14 9 12 6 14

What was the grouchy rhino's nickname?
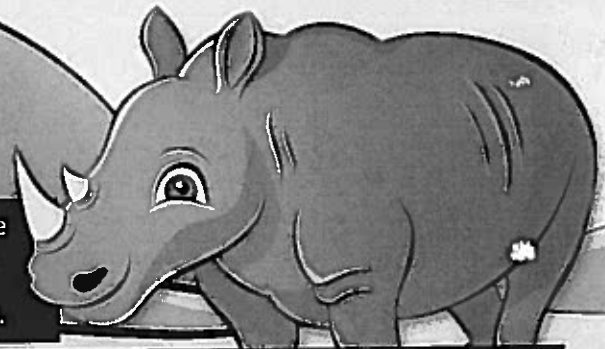
DIRECTIONS

Solve the following problems in the sections below. Then record the corresponding letter in the rectangles at the bottom to answer the riddle.
Note: The problem numbers match the numbered rectangles.

Use a ruler to draw a line from the ratio on the left to its equivalent ratio on the right:

① 2 to 4   ☐   **R**   ☐ 25:15

② 5 to 3   ☐   ☐ 34:6

③ 14:7   ☐   **N**   **S**   ☐ 64:56

④ 1 to 4   ☐   **O**   ☐ 3 to 4

⑤ 24:9   ☐   **H**   **I**   ☐ 3 to 12

⑥ 17:3   ☐   ☐ 12 to 8

⑦ 4:1   ☐   **O**   **E**   ☐ 6:12

⑧ 21:28   ☐   **H**   ☐ 1:2

⑨ 8 to 7   ☐   **E**   ☐ 8 to 3

⑩ 6:4   ☐   ☐ 2:1

⑪ 5 to 10   ☐   **T**   **W**   ☐ 7 to 10

⑫ 42:60   ☐   ☐ 20:5

⑬ Which ratio is equivalent to 5 bunnies for every 2 carrots?

   Y 12 bunnies for every 5 carrots
   E 25 bunnies for every 10 carrots
   O 10 carrots for every 4 bunnies

⑭ Which ratio is equivalent to 10 kids for every 2 parents?

   C 15 kids for every 3 parents
   S 4 kids for every 20 parents
   Z 14 kids for every 6 parents

									—						
7	3	13		12	10	4	1	11		8	14	5	2	9	6

Skill: Equivalent ratios

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Which bug has the best sense of smell?

LEGEND

O 3	**S** 13	**O** 9	**E** 4	**D** 30	**E** 65
F 28	**C** 7	**T** 2	**C** 36	**U** 51	**R** 6
E 11	**T** 1	**P** 72	**E** 12	**H** 5	
I 55	**E** 15	**N** 10	**S** 8		

Find the missing number to complete the proportion:

① $\dfrac{5}{6} = \dfrac{10}{\square}$

② $\dfrac{3}{\square} = \dfrac{9}{21}$

③ $\dfrac{7}{8} = \dfrac{\square}{32}$

④ $1:9 = \square:45$

⑤ $\square:12 = 6:36$

⑥ $4:\square = 6:9$

⑦ $9 \text{ to } \square = 54 \text{ to } 24$

⑧ $14 \text{ to } \square = 56 \text{ to } 12$

⑨ $5 \text{ to } 2 = \square \text{ to } 6$

⑩ $\dfrac{\square}{3} = \dfrac{40}{15}$

⑪ $\dfrac{10}{11} = \dfrac{50}{\square}$

⑫ $\dfrac{1}{\square} = \dfrac{7}{70}$

⑬ $13:14 = \square:70$

⑭ $12:\square = 4:10$

⑮ $44:99 = 4:\square$

⑯ $\square \text{ to } 4 = 77 \text{ to } 28$

⑰ $26 \text{ to } 8 = \square \text{ to } 4$

⑱ $17 \text{ to } \square = 34 \text{ to } 2$

⑲ $\dfrac{81}{\square} = \dfrac{27}{24}$

⑳ $11:17 = 33:\square$

㉑ $3 \text{ to } \square = 4 \text{ to } 48$

Riddle answer boxes:
☐☐☐ ☐☐☐☐☐–☐☐☐☐☐ , ☐☐ ☐☐☐☐☐ !
18 4 7   17 2 16 12 5   11 19 1 14 9   15 3   21 8 20 6 10 13

Skill: Proportions