SOL 6.1 – Ratios

6.1   The student will describe and compare data, using ratios, and will use appropriate notations, such as $\frac{a}{b}$, *a* to *b*, and *a:b*.

Understanding the Standard:

- A ratio is a comparison of any two quantities. A ratio is used to represent relationships within and between sets.

- A ratio can compare part of a set to the entire set (part-whole comparison).

- A ratio can compare part of a set to another part of the same set (part-part comparison).

- A ratio can compare part of a set to a corresponding part of another set (part-part comparison).

- A ratio can compare all of a set to all of another set (whole-whole comparison).

- The order of the quantities in a ratio is directly related to the order of the quantities expressed in the relationship. For example, if asked for the ratio of the number of cats to dogs in a park, the ratio must be expressed as the number of cats to the number of dogs, in that order.   *order matters*

- A ratio is a multiplicative comparison of two numbers, measures, or quantities.

- All fractions are ratios and vice versa.   *division*

- Ratios may or may not be written in simplest form.

- Ratios can compare two parts of a whole.

- Rates can be expressed as ratios.   *unit rate (3 apples = $6 → 1 apple = $2)*
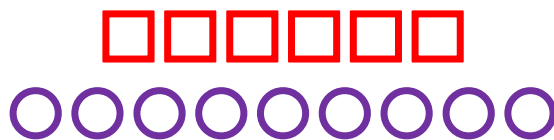
SOL 6.1 – Ratios

Ratios:

Ratios – a comparison of two quantities that have the same unit of measure.

❖ Be careful the **order** of the numbers IS important!

❖ Can be written three different ways:
  1. fraction
  2. with a **colon**
  3. the word **to**

Reduce or simplify ratios:

There are <u>**6 squares**</u> to **9 circles**. What is the ratio of **circles** to <u>**squares**</u> in simplest or lowest terms?

$\square\square\square\square\square$

$\bigcirc\bigcirc\bigcirc\bigcirc\bigcirc\bigcirc\bigcirc\bigcirc\bigcirc$

$\bigcirc = \dfrac{9 \div 3}{6 \div 3}$ $\dfrac{3}{2}$ **or**   **3:2**   **or**   **3 to 2**
$\square$

A = { ▲ ▲ ● ● }

B = { ▮ ▮ ▮ ▮ ▯ }

1. Shaded to unshaded in B = ___4:1___
2. Rectangles to Triangles = ___5:2___
3. Circles to A = ___2:4 = $\frac{1}{2}$___
4. A to B = ___4·5___

Vocabulary:

Ratio - a comparison of any two quantities

SET A   **SET B**
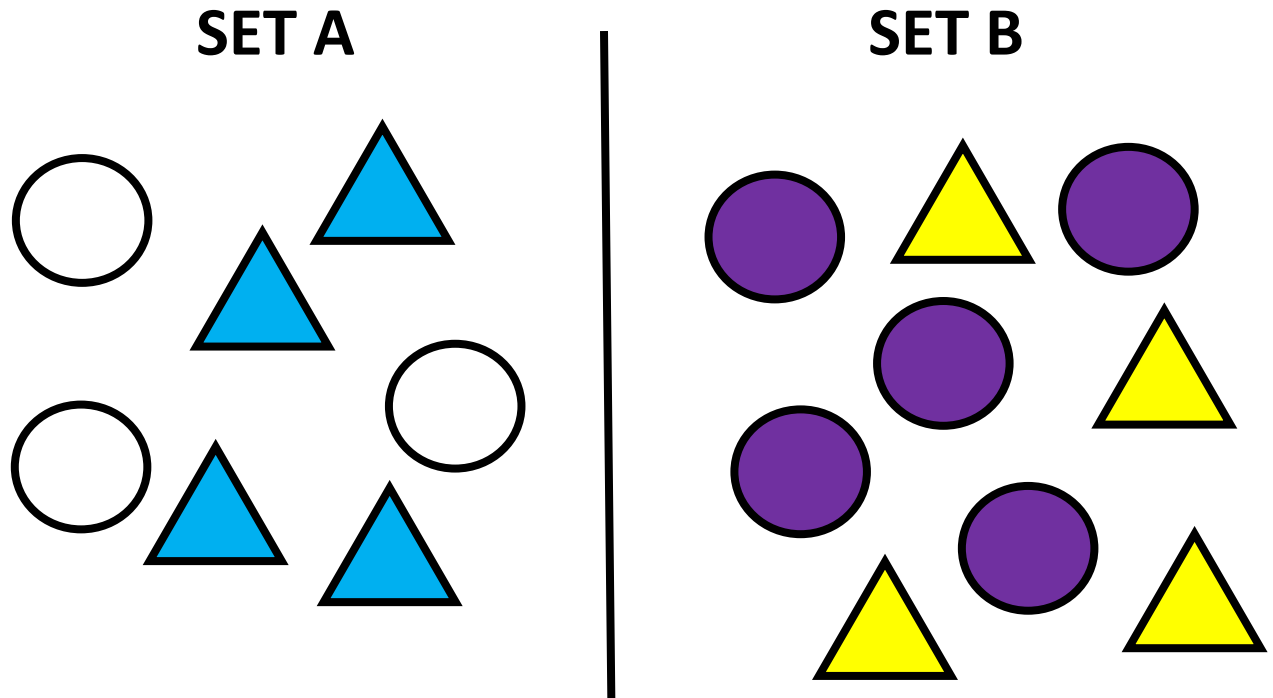
▲ to ◯	**4 to 3**
▲ to all of set A	$\dfrac{4}{7}$
◯ to ●	**3 : 5**
set B to set A	**9 to 7, $\dfrac{9}{7}$, or 9:7**

3

Essential Understandings:

What is a ratio?

*a comparison of any 2 quantities*

Order matters

3 ways to write : , to , or —

Essential Knowledge & Skills:

The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to

- Describe a relationship within a set by comparing part of the set to the entire set.

- Describe a relationship between two sets by comparing part of one set to a corresponding part of the other set.

- Describe a relationship between two sets by comparing all of one set to all of the other set.

- Describe a relationship within a set by comparing one part of the set to another part of the same set.

- Represent a relationship in words that makes a comparison by using the notations $\frac{a}{b}$, *a:b*, and *a to b.*

- Create a relationship in words for a given ratio expressed symbolically.

Practice:
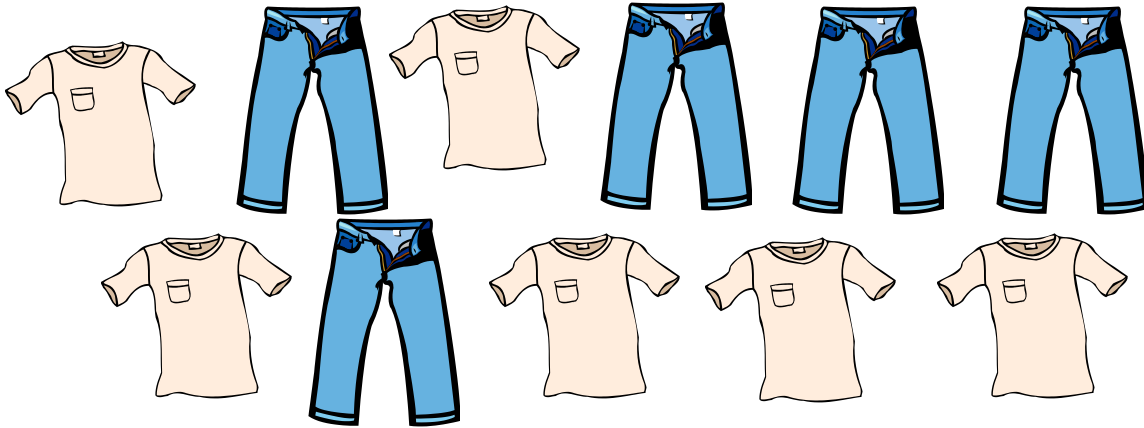
1. Write the ratio of 6 shirts to 5 pants using three different notations.

   6 to 5, $\frac{6}{5}$
   6:5,

2. Represent the ratio of shirts to pants using numbers other than 6 and 5.

   $$\frac{6}{5} = \frac{12}{10} = \frac{24}{20} = \frac{48}{40}$$

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3. Identify each picture that has a ratio of <u>2:3</u> for the number of <u>triangles</u> to the number of <u>circles</u>.

$\frac{6}{4}$

 $\frac{6}{9} = \frac{2}{3}$

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

$\frac{2}{3}$

$\frac{3}{2}$
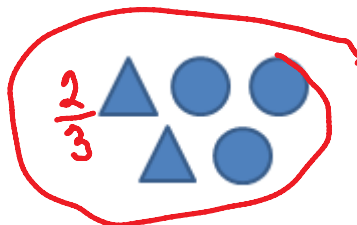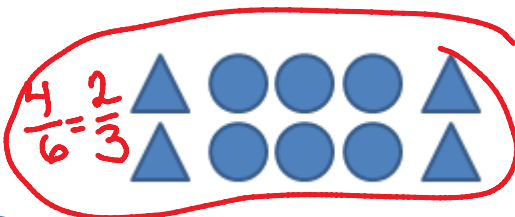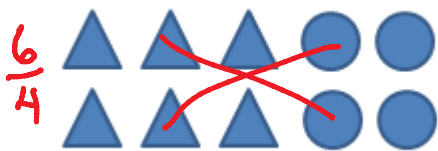
4. **A box contains red marbles and blue marbles. The ratio of red marbles to blue marbles in the box is 8 to 3. Select each statement that could represent the number of red marbles and blue marbles in this box.**

A. **There are exactly 3 red marbles and 8 blue marbles in the box.** $\frac{3}{8}$ ✗

B. **There are exactly 64 red marbles and 24 blue marbles in the box.** $\frac{64}{24} = \frac{8}{3}$ ✓

C. **There are exactly 18 red marbles and 13 blue marbles in the box.** $\frac{18}{13}$ ✗

D. **There are exactly 48 red marbles and 18 blue marbles in the box.** $\frac{48}{18} = \frac{8}{3}$ ✓

5. **A board contains stars and triangles. The ratio of triangles to stars is 3 to 1. Select each picture that could represent the number of stars and triangles on this board.**

$\frac{6}{2}$ ✓ $\frac{2}{6}$ ✗ $\frac{8}{3}$ ✗
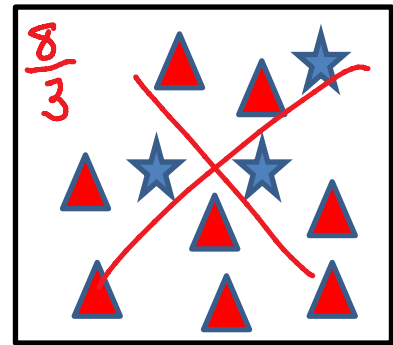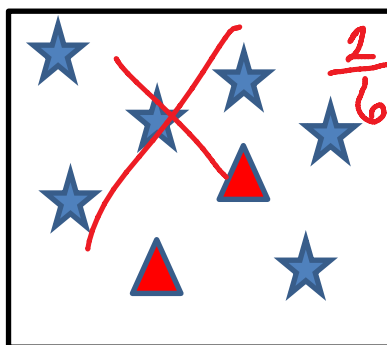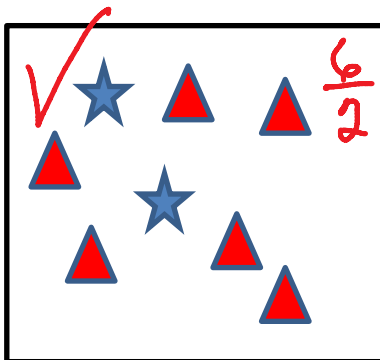
Released SOL Questions:

A bag contains red apples and yellow apples. The ratio of red apples to yellow apples in the bag is 9 to 4. Which of these statements could be true?

A There are exactly 6 red apples and 1 yellow apple in the bag. $\frac{6}{1}$ ✗

B There are exactly 18 red apples and 8 yellow apples in the bag. $\frac{18}{8} = \frac{9}{4}$ ✓

C There are exactly 4 red apples and 9 yellow apples in the bag. $\frac{4}{9}$ ✗

D There are exactly 9 red apples and 13 yellow apples in the bag. $\frac{9}{13}$ ✗