



The meaning of a ratio

Situation

Jack and Peter are having a basketball shoot-off in the basketball court. Jack shoots 15 times and scores 6 baskets and Peter shoots 10 times and scores 5 baskets. Who has the better shooting skills?

I think Jack scores more, so Jack has better shooting skills. Do you agree with me?

Situation

The level of shooting skills is not only linked to goals, but also to the number of shoots.

$$\frac{\text{Jack's number of goals}}{\text{Jack's number of shoots}} = \frac{6}{15} = \frac{2}{5}$$

$$\frac{\text{Peter's number of goals}}{\text{Peter's number of shoots}} = \frac{5}{10} = \frac{1}{2}$$

Because $\frac{1}{2} > \frac{2}{5}$, Peter's shooting skills are better than Dylan's.

Ratio

Suppose a and b are two similar scales or two numbers. To compare b with a , you need to divided a by b . This is called the ratio of a and b .

$$\begin{array}{ccc} a : b & \text{or} & \frac{a}{b} \quad (b \neq 0) \\ \downarrow \quad \downarrow & & \nearrow \quad \downarrow \\ \text{Preceding} & \text{Latter} & \text{Preceding} \\ \text{item} & \text{item} & \text{item} \\ & & \text{Latter} \\ & & \text{item} \end{array}$$

Fraction

Example 1

How many students are there in this class?

How many girls are there?

a. number of boys : number of girls

b. number of boys : number of students in the whole class

c. number of girls : number of students in the whole class

Exercise

If a class has 41 students and 18 of them are girls. Write down the following ratio.

a. number of girls : number of all the students

b. number of boys : number of all the students

c. number of girls : number of boys

Ratio

Suppose a and b are two similar scales or two numbers. To compare b with a , you need to divided a by b . This is called the ratio of a and b .

$$\begin{array}{ccc} & & \text{Preceding} \\ & & \text{item} \\ & \nearrow & \\ a : b & \text{or} & \frac{a}{b} \quad (b \neq 0) \\ \searrow \quad \searrow & & \nearrow \\ \text{Preceding} & \text{Latter} & \text{Latter} \\ \text{item} & \text{item} & \text{item} \end{array}$$

The *quotient* of the preceding item a divided by the latter item b is called the *ratio value*.

Example 2

What's the value of each ratio?

a. 36:6

b. 3:12

c. $\frac{9}{10} : \frac{6}{5}$

d. 75 inches : 60 inches

e. 18seconds:1.5minutes

Example 2

What's the value of each ratio?

(e) 18seconds:1.5minutes

=18seconds:90seconds

=18:90

=0.2

To find the ratio value of two similar scales, you should convert them into the same units, if they are different.

Exercise

What's the ratio value for each of these ratios?

a. 9:15

b. 0.2 : 0.8

c. $\frac{5}{2} : 0.8$

d. 75g:0.5kg

e. 5 feet : 40 inches

f. 5hours:160minutes

Summary

Relationship between ratio, fraction and division

$$a : b = \frac{a}{b} = a \div b$$

Ratio: preceding item : latter item = ratio value

Fraction: $\frac{\text{numerator}}{\text{denominator}} = \text{fraction}$

Division: dividend \div divisor = quotient

Example 3

Q1: I have 100 blue and green cards, If the number of blue cards to green cards is 2:3. How many blue cards I have?

Q2: I have some blue and green cards, 18 of them are blue. If the number of blue cards to green cards is 2:3. How many cards I have?

Q3: I have 100 cards , there are blue, red and green. If there are 20 red cards , the number of blue cards to green cards is 2:3. How many blue cards and green cards?

Summary

What have we learned today?

Ratio $a : b$ or $\frac{a}{b}$

Ratio value The *quotient* of the preceding item a divided by the latter item b