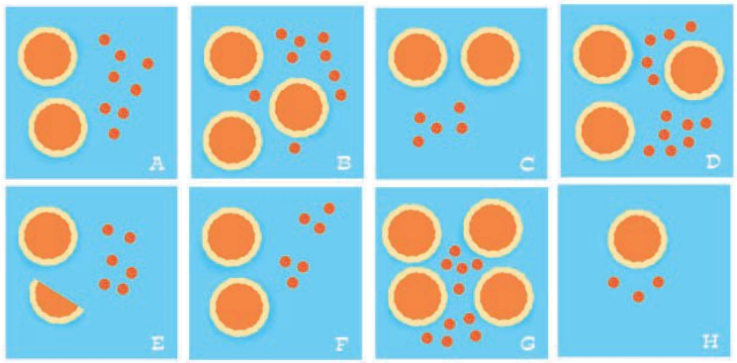
Lesson 7 5.6 Equivalent Ratios

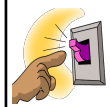
Which cards have the same ratio of pepperoni pieces to pizza (same amount of pepperoni on each pizza)



There are many ways to try to get an answer for this problem. Let's start by looking at the ratio pepperoni : pizza

A 8 : 2 B 9 : 3 C 5 : 2 D 12 : 3

E 6 : 1.5 F 6 : 2 G 10 : 4 H 3 : 1



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Cards B, F and H would all result in each pizza having 3 pieces of pepperoni on a pizza. Ratio 3 : 1

Cards A, D and E would all result in each pizza having 4 pieces of pepperoni on a pizza. Ratio 4 : 1

Cards C and G would each result in each pizza having $2\frac{1}{2}$ pieces of pepperoni on a pizza. Ratio $2\frac{1}{2}$: 1

The recipe on a can of hot chocolate powder suggests that 3 spoonfuls of powder to 1 cup of water. This can be written as a ratio of spoonfuls of powder to cups of water 3 : 1

How many spoonfuls of powder would be used if there are 2 cups of water? 6 Ratio 6 : 2

How many spoonfuls of powder would be used if there are 3 cups of water? 9 Ratio 9 : 3

How many spoonfuls of powder would be used if there are 4 cups of water? 12 Ratio 12 : 4

All of the ratios 3 : 1 6 : 2 9 : 3 and 12 : 4 are called equivalent ratios. This means the ratios are equal, or in this case the hot chocolate has the same taste.

Equivalent ratios are formed when we multiply all terms (numbers) of the ratio by the same amount.

3 : 1 ➡ 6 : 2 if we multiply both term by 2

3 : 1 ➡ 9 : 3 if we multiply both term by 3

3 : 1 ➡ 12 : 4 if we multiply both term by 4

6 : 2 ➡ 12 : 4 if we multiply both term by 2

Equivalent ratios can be created the same was as equivalent fractions. With fractions you multiply or divide both the numerator and denominator by the same numbers, with ratios you multiply or divide each term by the same amount.

1 : 2 2 : 4 4 : 8

All of the pie pictures show that $\frac{1}{2}$ of the pie is eaten, the are equivalent. The ratios of pieces remaining to whole pie look different because the pie is cut into a different number of pieces, but the ratios are the same.

Find Two Equivalent Ratios

5:20

Multiply	Divide
$5:20 \rightarrow \frac{5}{20}$	$5:20 \rightarrow \frac{5}{20}$
$\frac{5}{20} \cdot \frac{2}{2} = \frac{5 \cdot 2}{20 \cdot 2} = \frac{10}{40}$	$\frac{5}{20} \div \frac{5}{5} = \frac{5 \div 5}{20 \div 5} = \frac{1}{4}$
$\frac{10}{40} \rightarrow$ 10:40	$\frac{1}{4} \rightarrow$ 1:4

Both terms have been multiplied by 2

5 : 20 = 10 : 40

Both terms have been divided by 5

5 : 20 = 1 : 4

Note that these ratios were turned into fractions to create equivalent fractions and then turned back into ratios. This is not a necessary step and was only done for demonstration purposes.

Example 1: Write the ratio 16 : 20 in lowest terms.

As with fractions, ratios can be written in lowest terms. Find the greatest common factor (GCF) for 16 and 20.

The greatest common factor for 16 and 20 is 4

Divide both numbers by the GCF

16 ÷ 4 = 4 20 ÷ 4 = 5

So 16 : 20 in lowest terms is $16 \div 4 : 20 \div 4$ = 4 : 5

Example 2: Write 3 equivalent ratios for 6 : 9

6 : 9 = 2 : 3 divide both terms by 3

6 : 9 = 12 : 18 multiply both terms by 2

6 : 9 = 18 : 27 multiply both terms by 3

Example 3: A kit of Leggos blocks comes in the ratio of 40 yellow, 60 blue and 30 red. List 3 other kits that can be created with the same ratio of block colours.

The ration of yellow : blue : red is 40 : 60 : 30. We will have the same ratio of block colours if we multiply or divide each term in the ratio by the same amount

4 : 6 : 3 divide all terms by 10

20 : 30 : 15 divide all terms by 2

80 : 120 : 60 multiply all terms by 2

plus many more answers

Question to complete

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8, 9, 10 , 11, 13, 15