a place of mind

FACULTY OF EDUCATION

Department of
Curriculum and Pedagogy

Mathematics
Number: Ratios

Science and Mathematics Education Research Group

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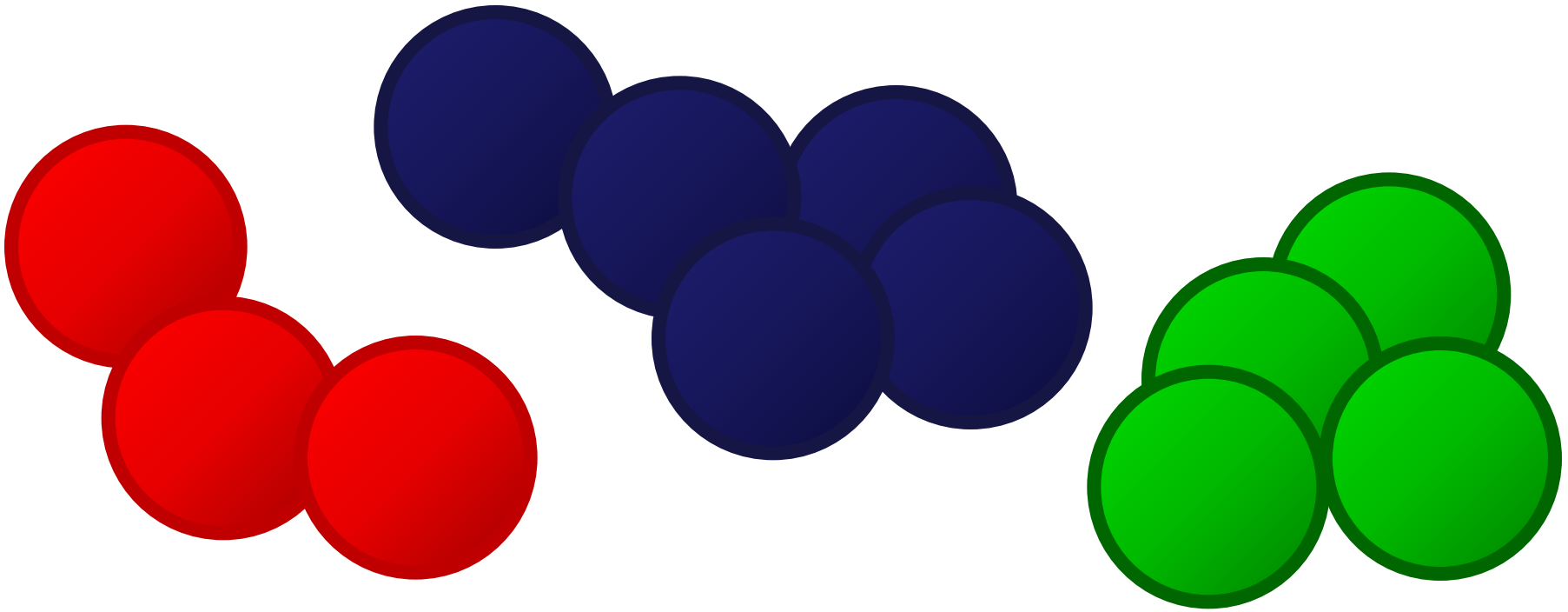
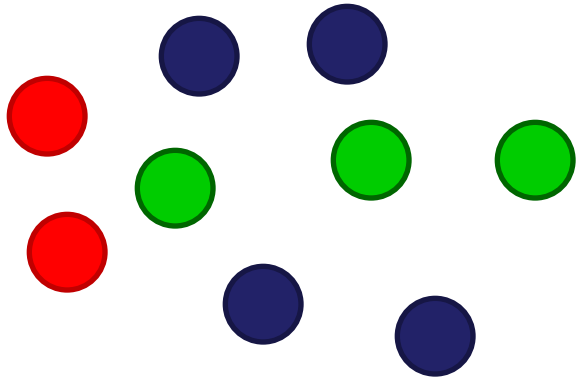
Ratios in a Bag of Candy

3 : 5 : 4



Ratios in a Bag of Candy I

Consider the following bag of candy:



Which statement below is incorrect?:

A. There are 2 red candies for every 4 blue candies

B. The ratio of red candies to blue candies is 1 to 2.

C. The ratio of red candies to blue candies is 4 to 2.

D. There are twice as many blue candies as there are red candies.

E. All statements are correct.

Solution

Answer: C

Justification: The statement "The ratio of red candies to blue candies is 4 to 2." is incorrect. Order is important in ratios because it tells you which amount is larger than the other.

The ratio of *red* candies to *blue* candies is 4 to 2. (incorrect, more red than blue)

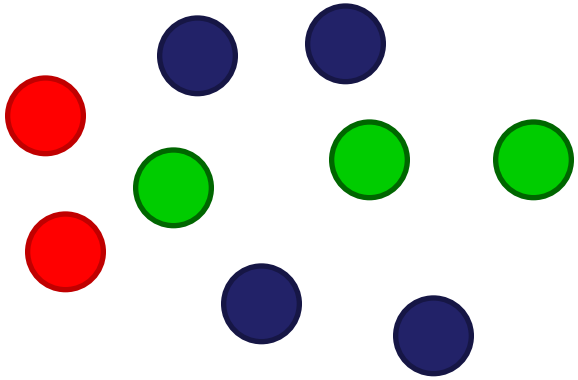
The ratio of *red* candies to *blue* candies is 2 to 4. (correct, less red than blue)

The ratio of *blue* candies to *red* candies is 4 to 2. (correct, more blue than red)

Statement B is correct because ratios can be reduced like fractions.

"The ratio of red candies to blue candies is 2:4." is the same as "The ratio of red candies to blue candies is 1:2."

Ratios in a Bag of Candy II



× 7

The ratio of red to green to blue candies in 1 bag of candy is 2 : 3 : 4. There are now seven bags of candy. Will the ratio of red to green to blue candies change?

A. Yes

B. No

C. Not sure

Solution

Answer: B

Justification: The ratio of red to green to blue candies will not change. When there are seven more bags of candy, there are:

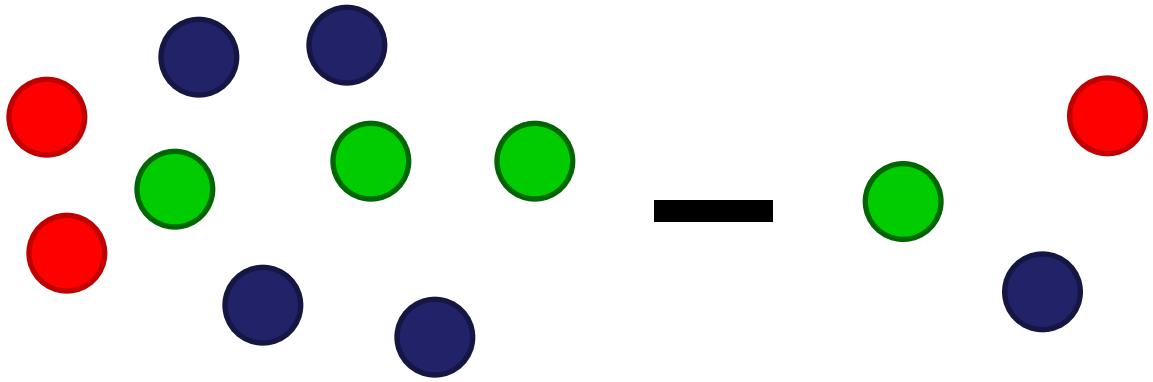
2 x 7 = 14 red candies

3 x 7 = 21 green candies

4 x 7 = 28 blue candies

The ratio 2 : 3 : 4 is exactly the same as 14 : 21 : 28. For every 2 red candies, there are still 3 green candies and 4 blue candies.

Ratios in a Bag of Candy III



The ratio of red to green to blue candies in a bag of candy is 2 : 3 : 4. Jeremy eats 1 red, 1 green, and 1 blue candy. Does the ratio of red to green to blue candies change?

A. Yes

B. No

C. Not sure

Solution

Answer: A

Justification: The ratio of red to green to blue candies will change. After removing 1 of each color:

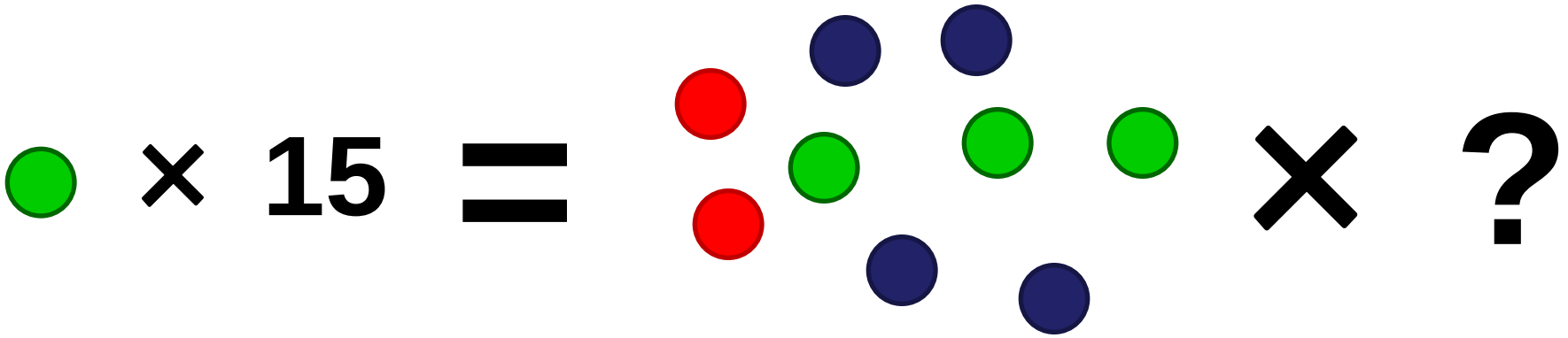
2 – 1 = 1 red candy

3 – 1 = 2 green candies

4 – 1 = 3 blue candies

The ratio 2 : 3 : 4 is not the same as 1 : 2 : 3. In most cases, only multiplying or dividing the terms in a ratio will result in an equivalent ratio.

Ratios in a Bag of Candy IV



Jeremy buys bags of candy until he has 15 green candies. How many candies does Jeremy have in total?

A. 5

B. 27

C. 45

D. 75

E. 135

Solution

Answer: C

Justification: The ratio of green candies to total candies is 3 to 9. When Jeremy buys more bags, this ratio stays the same.

$$\frac{green}{total} = \frac{3}{9} = \frac{15}{x}$$

Jeremy needs to buy 5 bags of candy to have 15 green candies. Since there are 9 candies per bag, he will have 45 total candies.

$$\underset{\times 5}{\frac{3}{9}} = \underset{\times 5}{\frac{15}{x}} \longrightarrow \frac{3}{9} = \frac{15}{45}$$

Jeremy needs to buy 5 bags, for a total of 45 candies.

Solution II

The following equation can also be solved using the following method:

$$\frac{3}{9} = \frac{15}{x}$$

Notice that *x* represents the total number of candies when there are 15 green candies

$$(9x)\frac{3}{9} = \frac{15}{x}(9x)$$

Multiply both sides by *9x* (a common denominator)

$$3x = 15(9)$$

Divide by 3

$$x = 45$$

Note: Reducing the fractions at the start will make the calculation easier. $\frac{3}{9} = \frac{1}{3}$

Ratios in a Bag of Candy V

Consider a different bag of candy with 4 different colours of candy: red, blue, green and purple. The bag has the following ratios:

blue : purple = 1:1, red : purple = 1:2, green : red = 5:2

If the bag has a total of 15 candies in it, how many blue candies are in the bag?

A. 1 blue candy

B. 2 blue candies

C. 3 blue candies

D. 4 blue candies

E. Not possible to have the given ratios if there are only 15 candies

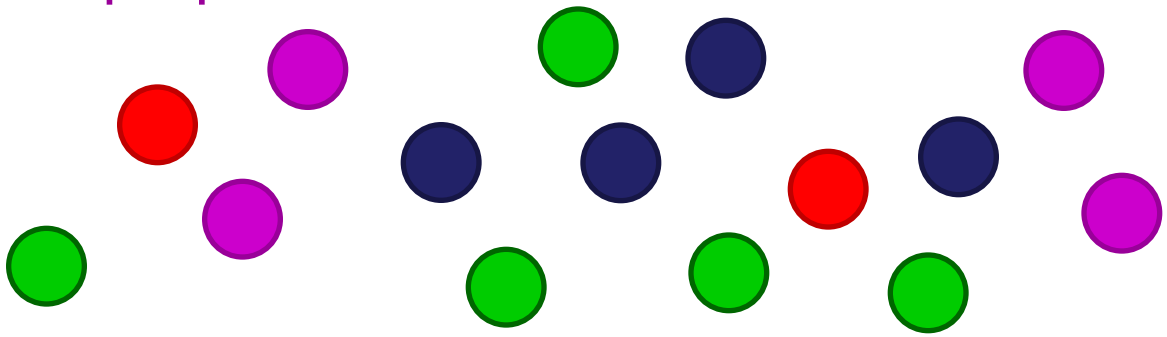
Solution

Answer: D

Justification: Start with the largest ratio: green : red = 5:2. There must be 5 green and 2 red since 10 green and 4 red will be too many candies after blue and purple candies are added (more than 15 total candies).

If there are 2 red candies, there must be 4 purple candies since the ratio red : purple = 1:2.

The ratio of purple to blue is 1:1, therefore there must be 4 blue candies.



(15 total candies)

Ratios in a Bag of Candy VI

Consider a different bag of candy with 4 different colours of candy: red, blue, green and purple. The bag has the following ratios:

red : green = 1:4, blue : green = 3:4, purple : green = 1:2

If the bag has a total of 20 candies in it, how many red candies are in the bag?

A. 1 red candy

B. 2 red candies

C. 3 red candies

D. 4 red candies

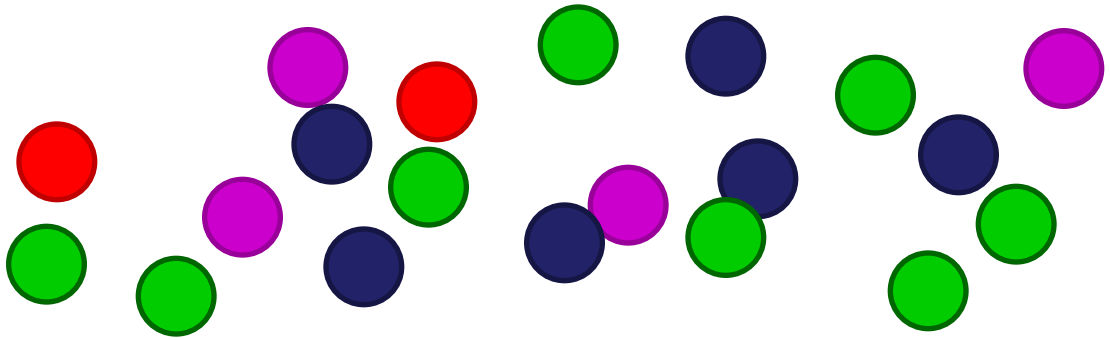
E. Not possible to have the given ratios if there are only 20 candies

Solution

Answer: B

Justification: Start with the largest ratio: blue : green = 3:4. Notice that all the given ratios involve green. If there are 4 green candies, there must be 3 blue candies, 1 red candy and 2 purple candies. This gives a total of 10 candies.

Since there are 20 candies in the bag, we must double the number of candies of each colour. Doubling each colour will double the total number of candies, but not change the ratios. Therefore, there will be 2 red candies.



(20 total candies)