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## Multiplying Fractions <br> Whole Numbers

5.NF.4.a, b

2

The word of here means "multiply." $\frac{3}{4}$ of 12 means $\frac{3}{4} \times 12$.

The general rule for multiplying a whole number by a fraction is

$$
\frac{a}{b} \times c=\frac{a \times c}{b}
$$

where $c \neq 0$
Multiplying a fraction by a whole number works the same way. Just reverse the factors.

$$
3 \times \frac{2}{7}=\frac{3 \times 2}{7}=\frac{6}{7}
$$

You can cancel common factors as a shorecyt.

$$
\begin{gathered}
\frac{3}{5} \times 20=\frac{3}{1} \times 20^{4}= \\
3 \times 4=12
\end{gathered}
$$

You can use multiplication to find fractions of whole nurnbers. Milena has 20 sheets of fancy paper. She yses $\frac{3}{5}$ of the sheets for a scrapbook. Hoyv many sheets of fapicy parer does she use?

To find the number of sheetsMilena uses in her project, find $\frac{3}{5}$ of 20.
You can use a phodel to find the answer.
Draw squares for 20 sheets of paper. Divide them into 5 equal


Then shade the squares in 3 of the 5 groups.
Count the number of shaded sheets. There are 12. That means that $\frac{3}{5}$ of 20 is 12 . So, Milena uses 12 sheets of fancy paper.
You can also use an equation to find a fraction of a whole number. Use an equation to find the number of sheets Milena uses. $\frac{3}{5}$ of 20 translates to $\frac{3}{5} \times 20$. Multiply the numerator and the whole number. Then divide the product by the denominator.

$$
\frac{3}{5} \times 20=\frac{3 \times 20}{5}=\frac{60}{5}=12
$$

Milena uses 12 sheets of fancy paper.

SAMPLE Rosa has 32 grapes. She eats $\frac{3}{8}$ of them now and saves the rest for later. Which expression will help Rosa find the number of grapes she saves for later?
A $\frac{3}{8}+32$
B $32 \div \frac{3}{8}$
C $32-\frac{3}{8}$
D $\frac{3}{8} \times$

The correct answer is D. This question asks you to find how many grapes Rosa saves for later. To do that, you need to subtraft a number from 32. That number is equal to $\frac{3}{8}$ of 32 . So, you need to find $\frac{3}{8}$ of 32 . This can be found with a multiplication expression, $\frac{3}{8} \times 32$.

1 A collecting jar holds 45 insects. $\frac{4}{5}$ of the insects are purple. The rest are blue. How many insects in the jar are blue?
A 41
C 9
B 36
D 1

2 What is $\frac{2}{9}$ of 63?
A 7
B 14


3 There were 400 people at a concert. Half of them wore yellow T-shirts, $\frac{2}{10}$ wore graly T-shirts, and the rest wore orange T-shiyts. How many people wore gray T-shirts?


4 piehae read 75 pages in a book. $\frac{1}{3}$ of the pages discussed birds, and $\frac{1}{5}$ discussed reptiles. The remaining pages discussed mammalis. How many pages discussed reptiles/or mammals?
A 15
C 40

B 25
D 50 What is $\frac{3}{11}$ of $99 ?$
A 9
C 27
B 18
D 39

6 On a menu, $\frac{1}{10}$ of the 60 dishes are chicken, $\frac{1}{6}$ are beef, $\frac{1}{3}$ are pork, and the rest are vegetarian. If Sergei doesn't like beef or pork, how many dishes can he choose from on this menu?
A 30
C 10
B 24
D 6

SAMPLE A science class counted 20 bird nests in the park. $\frac{2}{5}$ of/the nests had eggs, and $\frac{3}{10}$ of the nests had chicks. The rest of the nests were empty. How many nests were empty?

Answer $\qquad$

Find the number of nests with eggs: $\frac{2}{5} \times 20^{4}=8$ nests with eggs. Find the number of nests with chicks: $\frac{\beta}{10} \times 20^{2}=6$ nests with chicks. Add to find how many nests with eggs or chicks: $8+6=14$. Now, subtract to find the number of empty nests: $20-14=6$ empty nests. There were 6 empty nests.

7 There are 32 bottles on a shelf. Hamilton replaces $\frac{3}{8}$ of the bottles with cans. How many bottles did Hamilton replace?

Answer $\qquad$


8 What is $\frac{5}{6}$ of 72 ? Show your work

Answer


9 There are 100 senaters in the United States Senate. At least $\frac{2}{3}$ of them must vote yes in orderto ratify, or approve, a treaty. What is the least number of yes/votes needed to ratify a treaty? Round to the nearest whole number.

Read the problem. Write your answer to each part.
10 Dora uses the recipe below to make French toast for 12 people.

> Recipe for French Toast (Makes 2 servings)

Ingredients

- 2 eggs
- $\frac{3}{4}$ teaspoon sugar
- $\frac{1}{4}$ teaspoon salt
- $\frac{1}{2}$ cup milk
- 4 slices white bread

Part A Assuming each person will get 1 full serving, how much of each ingredient does Dora need to make enough French toast for everyone? Explain your answer.

How many times greater is 12 servings than 2 servings?


Part B If Dora uses the same recipe to make French toast for just herself, how can she find the amount of each ingredient she needs? Explain. $\qquad$


