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Wording for the legal statement above is adapted from the legal statement for *Trigonometry*, published in 2009 by The CK-12 Foundation: <http://about.ck12.org/>

Making Percent Questions Easier

1).

On average, 60% of the people at the game supported our team. There were 455 people watching the game. How many supported our team?

Picture representation:

You work on an 8% commission at a shoe store. You get to keep 8% of the total value of all the shoes you sell. How many dollars’ worth of shoes do you have to sell to make $90 for yourself?

60 support our team

100 total spectators

455 total spectators

**??** support our team

Equation representation:

 Please write and solve a proportion for this problem.

Picture representation:

2).

 Please draw a picture for this situation.

3).

Equation representation:

 Please write and solve a proportion for this problem.

When the variable is in the denominator, we can still cross-multiply like we always do.

$$x=3700÷4$$

Example

*x* =925

$$4x=3700$$

$$ \frac{4}{100} = \frac{37}{x}$$

• *x*

• 100

• 100

• *x*

$$ \frac{4x}{100x}=\frac{3700}{100x}$$

$$ \frac{424.5}{x} = \frac{87}{55}$$

Practice

5).

Practice:

6). Based on the pie chart below, how long does Ariana spend at practice every day? Please use a proportion to find out. Hint: the total number of hours in a day is \_\_\_\_\_.

7). Three friends go to a restaurant, and they each leave a tip of 20% of their bill. Based on the table below, how much was Juan’s bill?

|  |  |
| --- | --- |
| **Person** | **Money left for tip** |
| Raphael | $4.50 |
| Eric | $3.00 |
| Juan | $5.50 |

Whole-Class Discussion

8). How could we solve #7 with a fractional rate method? One way to set it up below is correct, and the other is not.

 *Let b* = *Juan’s bill (in dollars)*

 $\frac{20}{100}∙5.50=b$ or $\frac{20}{100}∙b=5.50$

a). Please circle the one you think is right. Hint: does the 5.50 represent “total bill”, or “the tip”?

 b). What’s the difference between the two choices? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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c). Let’s check your answer by setting up the problem with labels on each quantity. How can we make the labels match up right?

$$\frac{20 }{100 }$$

•

=

9). Let’s solve #6 with a fractional rate, too. Ariana spends 19% of each day at practice, and there are 24 hours in a day. We want to find out how many hours does she spend at practice every day. Which equation is correct?

 *Let p* = *hours spent at practice.*

 $\frac{19}{100}∙24=x$ or $\frac{19}{100}∙x=24$

(Circle one)

To make these problems easier, there’s a simple way to set up problems. We use a **percent sentence**.

**“Percent Sentences”: An Easy Way to Solve Percent Problems**

After “of” should be the total.

Step 1

Start with the percent, and “of”.

Step 2

Finish the sentence, using **only words**, in a way that makes sense to you.

68% of the shots taken are made.

Step 3

Translate your sentence into an equation.

$\frac{68}{100}$ **• x = 10**

**68% of** …

68% of **the shots taken are made.**

**.**

**0.68 • x = 10**

SCENARIO: On average, Courtney makes 68% of her free throw shots. How many shots will she have to take in order to make 10 shots?

Let’s practice using Steps 1-3 in these situations (finishing the problems by solving for *x* is optional for now):

Finish solving each problem:

10).

55% of the pizza was eaten. How much pizza had been ordered, if 12 pizzas had been eaten?

11).

You earned some money, and now 40% of it is spent. You started out with $252. How much did you spend?

55% of …

**Step 1:**

55% of the pizza was eaten.

**Step 2:**

**Step 3:**

$\frac{55}{100}$ • *x* = 12

**Now solve for x:**

40% of …

**Step 1:**

40% of the money was spent.

**Step 2:**

**Step 3:**

$\frac{40}{100}$ • 252 = *x*

$0.55$ • *x* = 12

**Please finish the problem:**

Just do Steps 1-2:

12). 65% of the drink is real fruit juice. There are 16 ounces (oz) of total drink in the bottle. How much real fruit juice is there?

13). When he pays taxes, Simon has to pay 21% of his income to the government. Last year, Simon paid $12,396 in taxes. What was his income last year?

Please do Steps 1-3 and solve for x:

14). You work at a store where you make 6% commission. That means you get to keep 6% of the total value of everything you sell. How much would you have to sell in order to make $1,000 on commission?

15). You take a poll because you’re thinking of running for president. Right now, 35% of the people would vote for you. If there are 150 million voters in the United States, how many would vote for you?

Small Group Practice

16). You get a grade of 85% on a test. The test had 62 points total. How many points did you get?

17). A small package of Cheetos has 110 calories that come from fat. Based on the table below, how many total calories are in each package?

Source: <http://www.fritolay.com/our-snacks/brands.html> retrieved Oct. 11, 2009.

|  |  |
| --- | --- |
| **Snack** | **% of Calories from Fat** |
| Baked Lays Chips | 12.5% |
| SunChips | 40% |
| Cheetos | 59% |

18). You decide to give all your employees a 6% raise. That means you will add 6% of their salary to what they already make. How much does someone have to be making before the raise, in order to get a raise of $1,500?

19). 54% of the store’s Dell computers are brand new. The rest are old models. Based on the chart below, how many Dell computers does the store have in stock?

|  |  |
| --- | --- |
| Type of Computer | Number of New Computers |
| Dell | 13 |
| Gateway | 11 |
| Lenovo | 55 |

20). Please solve #19 with a proportion.

21). Below, someone has set up a percent sentence for a question. What did the question say?

70% of the price was taken off.

$\frac{70}{100}$ • 99 = *x*

$0.70$ • 99 = *x*

What did the question say? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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22). In the ’08-’09 basketball season, LeBron James had a free throw percentage of 78%. He made 594 free throws that season. How many did he take?

(Source: <http://www.nba.com/playerfile/lebron_james/career_stats.html>)

a). Please solve this with a proportion.

**Proportion Method**

b). Now let’s try it with a percent sentence.

Should we get the same answer, or a different answer? \_\_\_\_\_\_\_\_\_\_\_

**Percent Sentence Method:**