Name _____ Date _____

Part of a Whole as a Percent

1. On a recent survey, 60% of those surveyed indicated that they preferred walking to running.
   a. If 540 people preferred walking, how many people were surveyed?

   b. How many people preferred running?

2. Which is greater: 25% of 15 or 15% of 25? Explain your reasoning using algebraic representations or visual models.

1. Represent each situation using an equation. Check your answer with a visual model or numeric method.
   a. What number is 40% of 90?
   b. What number is 45% of 90?
   c. 27 is 30% of what number?
   d. 18 is 30% of what number?
   e. 25.5 is what percent of 85?
   f. 21 is what percent of 60?

2. 40% of the students on a field trip love the museum. If there are 20 students on the field trip, how many love the museum?

3. Maya spent 40% of her savings to pay for a bicycle that cost her $\$85$.
   a. How much money was in her savings to begin with?
   b. How much money does she have left in her savings after buying the bicycle?

4. Curtis threw 15 darts at a dartboard. 40% of his darts hit the bull's-eye. How many darts did not hit the bull's-eye?

5. A tool set is on sale for $\$424.15$. The original price of the tool set was $\$499.00$. What percent of the original price is the sale price?

6. Matthew scored a total of 168 points in basketball this season. He scored 147 of those points in the regular season, and the rest were scored in his only playoff game. What percent of his total points did he score in the playoff game?

7. Brad put 10 crickets in his pet lizard's cage. After one day, Brad's lizard had eaten 20% of the crickets he had put in the cage. By the end of the next day, the lizard had eaten 25% of the remaining crickets. How many crickets were left in the cage at the end of the second day?

8. A furnace used 40% of the fuel in its tank in the month of March and then used 25% of the remaining fuel in the month of April. At the beginning of March, there were 240 gallons of fuel in the tank. How much fuel (in gallons) was left at the end of April?

9. In Lewis County, there were $2{,}277$ student athletes competing in spring sports in 2014. That was 110% of the number from 2013, which was 90% of the number from the year before. How many student athletes signed up for a spring sport in 2012?

10. Write a real-world word problem that could be modeled by the equation below. Identify the elements of the percent equation and where they appear in your word problem, and then solve the problem.

$$57.5 = p(250)$$

1. **On a recent survey, 60% of those surveyed indicated that they preferred walking to running.**

   a. **If 540 people preferred walking, how many people were surveyed?**

   Let n represent the number of people surveyed.

   $0.60n$ is the number of people who preferred walking.

   Since 540 people preferred walking,

   $$0.60n = 540$$
   $$n = \frac{540}{0.6} = \frac{5400}{6} = 900$$

   Therefore, 900 people were surveyed.

   b. **How many people preferred running?**

   Subtract 540 from 900.

   $$900 - 540 = 360$$

   Therefore, 360 people preferred running.

2. **Which is greater: 25% of 15 or 15% of 25? Explain your reasoning using algebraic representations or visual models.**

   They are the same.

   $$0.25 \times 15 = \frac{25}{100} \times 15 = 3.75$$
   $$0.15 \times 25 = \frac{15}{100} \times 25 = 3.75$$

   Also, you can see they are the same without actually computing the product because of any order, any grouping of multiplication.

   $$\frac{25}{100} \times 15 = 25 \times \frac{1}{100} \times 15 = 25 \times \frac{15}{100}$$

Students should be encouraged to solve these problems using an algebraic approach.

1. **Represent each situation using an equation. Check your answer with a visual model or numeric method.**

   a. **What number is 40% of 90?**

   $$n = 0.40(90)$$
   $$n = 36$$

   b. **What number is 45% of 90?**

   $$n = 0.45(90)$$
   $$n = 40.5$$

c. 27 is 30% of what number?

$$27 = 0.3n$$
$$\frac{27}{0.3} = 1n$$
$$90 = n$$

d. 18 is 30% of what number?

$$0.30n = 18$$
$$1n = \frac{18}{0.3}$$
$$n = 60$$

e. 25.5 is what percent of 85?

$$25.5 = p(85)$$
$$\frac{25.5}{85} = 1p$$
$$0.3 = p$$
$$0.3 = \frac{30}{100} = 30\%$$

f. 21 is what percent of 60?

$$21 = p(60)$$
$$0.35 = p$$
$$0.35 = \frac{35}{100} = 35\%$$

2. 40% of the students on a field trip love the museum. If there are 20 students on the field trip, how many love the museum?

Let s represent the number of students who love the museum.

$$s = 0.40(20)$$
$$s = 8$$

Therefore, 8 students love the museum.

3. Maya spent 40% of her savings to pay for a bicycle that cost her $\$85$.

a. How much money was in her savings to begin with?

Let s represent the unknown amount of money in Maya's savings.

$$85 = 0.4s$$
$$212.5 = s$$

Maya originally had $\$212.50$ in her savings.

b. How much money does she have left in her savings after buying the bicycle?

$$\$212.50 - \$85.00 = \$127.50$$

She has $\$127.50$ left in her savings after buying the bicycle.

4. Curtis threw 15 darts at a dartboard. 40% of his darts hit the bull's-eye. How many darts did not hit the bull's-eye?

Let d represent the number of darts that hit the bull's-eye.

$d = 0.4(15)$

$d = 6$

6 darts hit the bull's-eye. $15 - 6 = 9$, so 9 darts did not hit the bull's-eye.

5. A tool set is on sale for $\$424.15$. The original price of the tool set was $\$499.00$. What percent of the original price is the sale price?

Let p represent the unknown percent.

$424.15 = p(499)$

The sale price is 85% of the original price.

6. Matthew scored a total of 168 points in basketball this season. He scored 147 of those points in the regular season and the rest were scored in his only playoff game. What percent of his total points did he score in the playoff game?

Matthew scored 21 points during the playoff game because $169 - 147 = 21$.

Let p represent the unknown percent.

$21 = p(168)$

The points that Matthew scored in the playoff game were 12.5% of his total points scored in basketball this year.

7. Brad put 10 crickets in his pet lizard's cage. After one day, Brad's lizard had eaten 20% of the crickets he had put in the cage. By the end of the next day, the lizard had eaten 25% of the remaining crickets. How many crickets were left in the cage at the end of the second day?

Day 1:

$n = 0.2(10)$

$n = 2$

At the end of the first day, Brad's lizard had eaten 2 of the crickets.

Day 2:

$n = 0.75(10 - 2)$

$n = 0.75(8)$

$n = 6$

At the end of the second day, Brad's lizard had eaten a total of 4 crickets, leaving 6 crickets in the cage.

8. A furnace used 40% of the fuel in its tank in the month of March and then used 25% of the remaining fuel in the month of April. At the beginning of March, there were 240 gallons of fuel in the tank. How much fuel (in gallons) was left at the end of April?

March:

$n = 0.4(240)$

$n = 96$

Therefore, 96 gallons were used during the month of March, which means 144 gallons remain.

April:

$n = 0.25(144)$

$n = 36$

Therefore, 36 gallons were used during the month of April, which means 108 gallons remain.

There were 144 gallons of fuel remaining in the tank at the end of March and 108 gallons of fuel remaining at the end of April.

9. **In Lewis County, there were $2,277$ student athletes competing in spring sports in 2014. That was 110% of the number from 2013, which was 90% of the number from the year before. How many student athletes signed up for a spring sport in 2012?**

2013:

$2,277 = 1.10a$

$2,070 = a$

Therefore, $2,070$ student athletes competed in spring sports in 2013.

2012:

$2,070 = 0.9a$

$2,300 = a$

Therefore, $2,300$ student athletes competed in spring sports in 2012.

There were $2,070$ students competing in spring sports in 2013 and $2,300$ students in 2012.

10. **Write a real-world word problem that could be modeled by the equation below. Identify the elements of the percent equation and where they appear in your word problem, and then solve the problem.**

$$57.5 = p(250)$$

Answers will vary. Greig is buying sliced almonds for a baking project. According to the scale, his bag contains 57.5 grams of almonds. Greig needs 250 grams of sliced almonds for his project. What percent of his total weight of almonds does Greig currently have?

The quantity 57.5 represents the part of the almonds that Greig currently has on the scale, the quantity 250 represents the 250 grams of almonds that he plans to purchase, and the variable p represents the unknown percent of the whole quantity that corresponds to the quantity 57.5.

$$\begin{aligned} 57.5 &= p(250) \\ \frac{1}{250}(57.5) &= p\left(\frac{1}{250}\right)(250) \\ \frac{57.5}{250} &= p(1) \\ 0.23 &= p \\ 0.23 &= \frac{23}{100} = 23\% \end{aligned}$$

Greig currently has 23% of the total weight of almonds that he plans to buy.