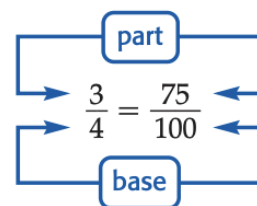**USE THE PERCENT PROPORTION** In a **percent proportion**, one of the numbers, called the **part**, is being compared to the whole quantity, called the **base**. The other ratio is the percent, written as a fraction, whose base is 100.

part
$$\frac{3}{4} = \frac{75}{100}$$
base

Key Concept   *Percent Proportion*

- **Words** $\dfrac{\text{part}}{\text{base}} = \dfrac{\text{percent}}{100}$

- **Symbols** $\dfrac{a}{b} = \dfrac{p}{100}$, where a is the part, b is the base, and p is the percent.

Example 1 *Find the Percent*

Five is what percent of 8?

Five is being compared to 8. So, 5 is the part and 8 is the base. Let p represent the percent.

$\dfrac{a}{b} = \dfrac{p}{100} \rightarrow \dfrac{5}{8} = \dfrac{p}{100}$ Replace a with 5 and b with 8.

$\quad\quad 5 \cdot 100 = 8 \cdot p$ Find the cross products.

$\quad\quad\quad\quad 500 = 8p$ Simplify.

$\quad\quad\quad \dfrac{500}{8} = \dfrac{8p}{8}$ Divide each side by 8.

$\quad\quad\quad 62.5 = p$ So, 5 is 62.5% of 8.

Example 2 Find the Percent

What percent of 4 is 7?

Seven is being compared to 4. So, 7 is the part and 4 is the base. Let p represent the percent.

$$\frac{a}{b} = \frac{p}{100} \rightarrow \frac{7}{4} = \frac{p}{100} \qquad \text{Replace } a \text{ with 7 and } b \text{ with 4.}$$

$$7 \cdot 100 = 4 \cdot p \qquad \text{Find the cross products.}$$

$$700 = 4p \qquad \text{Simplify.}$$

$$\frac{700}{4} = \frac{4p}{4} \qquad \text{Divide each side by 4.}$$

$$175 = p \qquad \text{So, 175\% of 4 is 7.}$$

Example 3 Apply the Percent Proportion

ENVIRONMENT The graphic shows the number of threatened species in the United States. What percent of the total number of threatened species are mammals?

Compare the number of species of mammals, 37, to the total number of threatened species, 443. Let a represent the part, 37, and let b represent the base, 443, in the percent proportion. Let p represent the percent.

USA TODAY Snapshots®

Number of threatened species in USA

Plants 168
Reptiles 27
Birds 55
Amphibians 25
Mammals 37
Fish 131

Source: The International Union for Conservation of Nature and Natural Resources

By Hilary Wasson and Alejandro Gonzalez, USA TODAY

$$\frac{a}{b} = \frac{p}{100} \rightarrow \frac{37}{443} = \frac{p}{100}$$
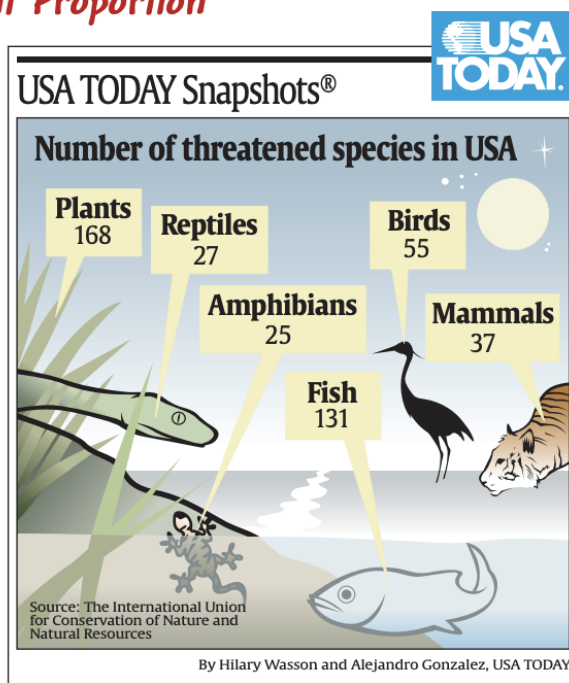
$$37 \cdot 100 = 443 \cdot p$$

$$3700 = 443p \qquad \text{Simplify.}$$

$$\frac{3700}{443} = \frac{443p}{443} \qquad \text{Divide each side by 443.}$$

$$8.4 \approx p \qquad \text{Simplify.}$$

So, about 8.4% of the total number of threatened species are mammals.

Concept Summary — Types of Percent Problems

Type	Example	Proportion
Find the Percent	3 is <u>what percent</u> of 4?	$\dfrac{3}{4} = \dfrac{p}{100}$
Find the Part	<u>What number</u> is 75% of 4?	$\dfrac{a}{4} = \dfrac{75}{100}$
Find the Base	3 is 75% of <u>what number</u>?	$\dfrac{3}{b} = \dfrac{75}{100}$

Example 4 Find the Part

What number is 5.5% of 650?

The percent is 5.5, and the base is 650. Let a represent the part.

$\dfrac{a}{b} = \dfrac{p}{100} \rightarrow \dfrac{a}{650} = \dfrac{5.5}{100}$ Replace b with 650 and p with 5.5.

$\qquad a \cdot 100 = 650 \cdot 5.5$ Find the cross products.

$\qquad 100a = 3575$ Simplify.

$\qquad a = 35.75$ Mentally divide each side by 100.

So, 5.5% of 650 is 35.75.

Example 5 Apply the Percent Proportion

CHORES Use the graphic to determine how many of the 1074 youths surveyed do not clean their room because there is not enough time.

The total number of youths is 1074. So, 1074 is the base. The percent is 29%.

To find 29% of 1074, let b represent the base, 1074, and let p represent the percent, 29%, in the percent proportion. Let a represent the part.

USA TODAY Snapshots®

Kids don't enjoy cleaning their rooms

When 1,074 youths 19 and under were asked why they don't clean their room more often, these were their responses[1]:

I don't like to   66%
Not enough time   29%
I'm too lazy   28%
The rest of the house is dirty 6%
No reply   2%

1 — More than one response allowed

Source: BSMG Worldwide   By Lori Joseph and Sam Ward, USA TODAY

$\dfrac{a}{b} = \dfrac{p}{100} \rightarrow \dfrac{a}{1074} = \dfrac{29}{100}$

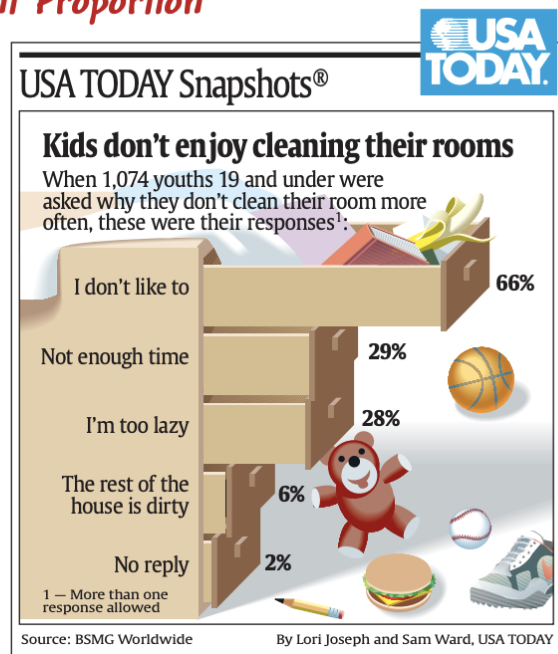$\qquad a \cdot 100 = 1074 \cdot 29$

$\qquad 100a = 31146$ Simplify.

$\qquad a = 311.46$ Mentally divide each side by 100.

So, about 311 youths do not clean their room because there is not enough time.

Example 6 Find the Base

Fifty-two is 40% of what number?

The percent is 40% and the part is 52. Let b represent the base.

$$\frac{a}{b} = \frac{p}{100} \rightarrow \frac{52}{b} = \frac{40}{100}$$ Replace a with 52 and p with 40.

$$52 \cdot 100 = b \cdot 40$$ Find the cross products.

$$5200 = 40b$$ Simplify.

$$\frac{5200}{40} = \frac{40b}{40}$$ Divide each side by 40.

$$130 = b$$ Simplify.

So, 52 is 40% of 130.

Use the percent proportion to solve each problem. Round to the nearest tenth.

9. 72 is what percent of 160?

10. 17 is what percent of 85?

11. 36 is 72% of what number?

12. 27 is 90% of what number?

13. What is 44% of 175?

14. What is 84% of 150?

15. 52.2 is what percent of 145?

16. 19.8 is what percent of 36?

17. 14 is $12\frac{1}{2}$% of what number?

18. 36 is $8\frac{3}{4}$% of what number?

19. 7 is what percent of 3500?

20. What is 0.3% of 750?

21. BIRDS If 12 of the 75 animals in a pet store are parakeets, what percent are parakeets?

22. FISH Of the fish in an aquarium, 26% are angelfish. If the aquarium contains 50 fish, how many are angelfish?