

Date 11/1/11
Unit 2B

Percents
(Sections 2.8 and 2.9)

Calculating Basic Percents:

$$\frac{\text{Part}}{\text{Whole}} = \frac{\text{Percent}}{100}$$

or

$$\frac{\text{"is"}}{\text{"of"}} = \frac{\text{percent}}{100}$$

- Plug in the numbers.
- Cross Multiply
- Solve for x!

Try some:

1. What is 60% of 20?

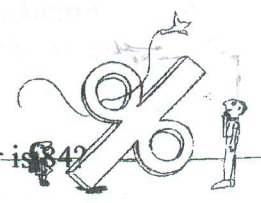
4. 75% of what number is \$4?

2. Find 14% of 70.

5. What percent is 30 out of 50?

3. 60% of what number is 12?

6. What percent is 12 out of 128?



Applications of Percents:

1. Jan purchased a new sweater which sells for \$39.90. The sales tax rate in her city is 8 1/2%. What is the cost of the sweater including sales tax?

let x = amount of tax

$$\frac{x}{39.90} = \frac{8.5}{100}$$
$$\frac{339.15}{100} = \frac{100x}{100}$$
$$3.39 = x$$
$$\begin{array}{r} \$39.90 \\ + 3.39 \\ \hline \$43.29 \end{array}$$

2. Bob must pay income tax of 14.7%. Last year Bob earned \$98,500. How much income tax must Bob pay?

let x = income tax

$$\frac{x}{98500} = \frac{14.7}{100}$$
$$\frac{1447950}{100} = \frac{100x}{100}$$
$$14479.5 = x$$

3. Mr. Smith bought supplies for the basketball team. If the subtotal before taxes was \$245, and the total after sales tax was added was \$263.38, what is the sales tax rate?

let x = sales tax rate

$$\frac{18.38}{245} = \frac{x}{100}$$
$$\frac{245x}{245} = \frac{1838}{245}$$
$$x = 7.5\%$$

4. Claire buys a book that is on sale for 30% off the original price of \$24. What is the sale price?

let x = sales price

$$\frac{x}{24} = \frac{30}{100}$$

$$\frac{720}{100} = \frac{100x}{100}$$

$$7.2 = x$$

$$\begin{array}{r} \$24.00 \\ - 7.20 \\ \hline \$16.80 \end{array}$$

5. Zach buys a pair of shoes that is on sale for 15% off the original price of \$49.99. What is the amount of the discount?

let x = amount of discount

$$\frac{x}{49.99} = \frac{15}{100}$$

$$\frac{749.85}{100} = \frac{100x}{100}$$

$$7.5 = x$$

6. Emma wants to purchase a sweater that is on sale for 40% off the original price of \$60. What is the sale price of the sweater?

let x = sale price

$$\frac{x}{60} = \frac{40}{100}$$

$$\frac{2400}{100} = \frac{100x}{100}$$

$$24 = x$$

$$\begin{array}{r} \$60.00 \\ - 24.00 \\ \hline \$36.00 \end{array}$$

7. The regular admission price to an amusement park is \$28. You have a coupon for a certain percent off of the admission. You pay \$21 to get into the park. What percent off was the coupon?

let x = percent off coupon

$$\frac{7}{28} = \frac{x}{100}$$

$$\frac{7x}{28} = \frac{700}{28}$$

$$x = 25.70$$

8. Sarah buys a pair of jeans that is on sale for 25% off the original price of \$39.99. What is the sale price?

let x = sale price

$$\frac{x}{39.99} = \frac{25}{100}$$

$$\frac{999.75}{100} = \frac{100x}{100}$$

$$9.9975 = x$$

$$\begin{array}{r} \$39.99 \\ - 10.00 \\ \hline \$29.99 \end{array}$$

9. Todd earns \$175 a week in salary and 12% commission on sales. How much must he have in sales to ear \$250 in one week.

let x = amount of money in sales

$$\frac{75}{x} = \frac{12}{100}$$

$$\frac{12x}{12} = \frac{7500}{12}$$

$$x = 625$$

10. Randy is a used car salesman who earns a 4 1/4% commission on every vehicle he sells. One day he sold a car for \$9995. What was the amount of his commission?

let x = commission

$$\frac{x}{9995} = \frac{4.25}{100}$$

$$\frac{42478.75}{100} = \frac{100x}{100}$$

$$424.7875 = x$$

11. A class sold magazine subscriptions as a fund raising event so they could go on a class trip. They earned a 30% commission on their total sales. If the class sold a total of \$3850 in magazine subscriptions, how much did the class earn toward their trip?

let x = money earned

$$\frac{x}{3850} = \frac{30}{100}$$

$$\frac{115500}{100} = \frac{100x}{100}$$

$$\$ 1155 = x$$

12. Joe sells real estate and earns a weekly salary of \$340 plus 5% commission on all sales. If he sold a home for \$89,000, what was his total pay for the week?

let x = commission

$$\frac{x}{89,000} = \frac{5}{100}$$

$$\frac{445000}{100} = \frac{100x}{100}$$

$$4450 = x$$

$$\begin{array}{r} \$4450 \\ + 340 \\ \hline \$4790 = \text{total pay} \end{array}$$

13. Suzie makes 6% commission on all car sales. If she earned \$4,000 in one month, what was the total cost of all the cars that she sold?

let x = total cost

$$\frac{4000}{x} = \frac{6}{100}$$

$$\frac{4x}{6} = \frac{400000}{6}$$

$$x = 66666.67$$

$$\$ 66,666.67$$

14. Amanda is a realtor. She sold a house for \$129,000 and earned \$7,740. What is her commission rate?

let x = % off

$$\frac{7740}{129,000} = \frac{x}{100}$$

$$\frac{774000}{129000} = \frac{129000x}{129000}$$

$$6 = x$$

15. Jenny's lunch bill came to \$25.00. If she tipped 18%, what would be the total cost of her meal?

let x = tip cost

$$\frac{x}{25} = \frac{18}{100}$$

$$\frac{450}{100} = \frac{100x}{100}$$

$$x = 4.5 = x$$

$$\begin{array}{r} \$25.00 \\ + 4.50 \\ \hline \$29.50 \end{array}$$

16. The Kelly family had a wonderful meal at a new restaurant in town. The bill was \$63 dollars. If Mr. Kelly left a 15% tip, what was the total cost of the meal?

let x = tip cost

$$\frac{x}{63} = \frac{15}{100}$$

$$\frac{100x}{100} = \frac{945}{100}$$

$$x = \$9.45 \text{ tip}$$

$$\begin{array}{r} \$63.00 \\ + 9.45 \\ \hline \$72.45 = \text{total cost} \end{array}$$

amt = amount

Relative Error

Error in measurement may be represented by the actual amount of error, or by a ratio comparing the error to the size of the measurement.

The absolute error of the measurement shows actual amt. of error.

The relative error of the measurement shows how large the error is in comparison to the actual amount.

$$\text{Relative Error} = \frac{|\text{measured value} - \text{actual value}|}{\text{actual value}}$$

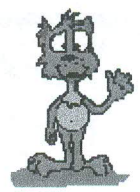
To find PERCENT relative error, move decimal 2 spots to the right.

1. Skeeter, the dog, weighs exactly 36.5 pounds. When weighed on a defective scale, he weighed 38 pounds.

What is the percent of error in measurement of the defective scale to the *nearest tenth*?

$$\begin{array}{r} 38.0 \\ - 36.5 \\ \hline 1.5 \end{array} \quad \frac{1.5}{36.5} = 0.041$$

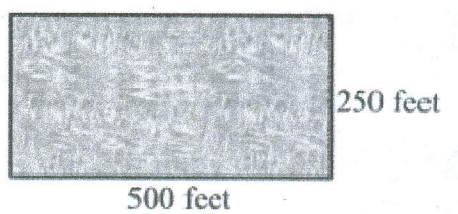
4.1% error



2. The actual length of this field is 500 feet. A measuring instrument shows the length to be 508 feet.

Find:

- a.) the absolute error in the measured length of the field.
- b.) the **relative error in the measured length of the field.**
- c.) the percentage error in the measured length of the field



3. The radius of this circular dartboard is measured as 9 inches, rounded to the *nearest inch*. The actual radius is 8.6 inches. What, to the *nearest percent*, is the percent of error in the measurement of the radius?



- 5. A student mistakenly measures the length of a radius to be 24 inches. The actual radius is 25 inches.
 - a. What is the student's percent of error on this measurement?
 - b. If the student uses this measurement to compute the area of a circle with this radius, what is the student's percent of error on the area computation, to the *nearest tenth of a percent*?

