

Algebra 2

1.3 - Multi-Step Percentages Word Problems

Percent of Increase or Decrease Problems

$$\% \text{ of } \uparrow \text{ or } \downarrow = \frac{\text{change}}{\text{original}}$$

ex 1) The price of a bicycle goes from \$40 to \$50. What is the percent increase?

$$\frac{50 - 40}{40} = \frac{10}{40} = \frac{1}{4} = .25 = 25\%$$

ex 2) The sale price of a shirt is \$30. If this is 20% off, what is the original price?

New

\$37.50

$$\cancel{x} \cdot \frac{x - 30}{x} = .20 \cdot x$$

$$\cancel{-x} - 30 = \frac{.2x}{\cancel{-x}}$$

$$\frac{-30}{-.8} = \frac{-.8x}{-.8}$$

$$37.50 = x$$

Try this:

1. The value of a house in 1996 was \$80,000. If its value in 1997 is \$85,000, by what % did the value of the house increase?

$$\frac{85,000 - 80,000}{80,000} = \frac{5,000}{80,000} = .0625$$

(6%)

2. A television is on sale at a 15% discount. If the original price was \$300, what is the sale price?

~~$$\frac{300 - X}{300} = .15 \cdot 300$$~~

$$\begin{array}{r} 300 - X \\ - 300 \end{array} = \begin{array}{r} 45 \\ - 300 \end{array}$$

$$\frac{-X}{-1} = \frac{-255}{-1}$$

$$X = \boxed{\$255}$$

$$.15 \cdot 300$$

$$= \$45 \text{ discount}$$

$$300 - 45$$

$$\boxed{\$255}$$

Backwards Percentage Problems

1) A book store uses a 20% markup on cost to make their profit. Find the original cost of a book that sells for \$15.99

$$\begin{array}{l} x \\ \text{orig} \end{array} + \underbrace{.20x}_{\text{amt of markup}} = 15.99$$

$$\frac{1.20x}{1.2} = \frac{15.99}{1.2}$$

$$x = \boxed{\$13.33}$$

$$\begin{array}{l} 100\% \text{ of Original} \\ + \\ 20\% \text{ of Original} \\ = \text{Sale Price} \end{array}$$

$$x \left(\frac{100\%}{1} + \frac{20\%}{.20} \right) = 15.99$$

$$x(1.2) = 15.99$$

Try this:

A snorkel is marked down 23%. The sale price is \$42.50.
What was the original price?

$$p - .23p = 42.50$$

$$\frac{.77p}{.77} = \frac{42.50}{.77}$$

$$p = \boxed{\$55.20}$$

Rick found a T-shirt on sale for 40% off the clearance price. The clearance price was already 25% off the original price. The original price was \$32.00. How much did Rick pay for the shirt if there is a tax rate of 7.25%?

A) \$11.20

B) \$12.01

C) \$14.40

D) \$15.44

32.00

$$25\% \text{ off of } \$32.00 = .25 \cdot 32 = \$8$$

$$32 - 8 = \$24 \text{ clearance price}$$

$$40\% \text{ off of } \$24 = .4 \cdot 24 = \$9.60$$

$$24 - 9.60 = \$14.40 \text{ 40\% off clearance}$$

$$7.25\% \text{ of } 14.40 = .0725 \cdot 14.40 = \$1.04$$

$$14.40 + 1.04 = \$15.44$$

Homework:



Worksheet

1.3 Multi-step Percentages Word Problems + WS + Key 5th hr.notebook September 27, 2016

Algebra 2 1.3 Multi-Step Word Problems Practice

Name: _____ Date: _____ Hour: _____

1. Suppose you bought something that was priced at **\$6.95**, and the total bill was **\$7.61**. What is the sales tax rate in this city? (Round answer to one decimal place.)

2. Suppose a certain item used to sell for seventy-five cents a pound, you see that it's been marked up to eighty-one cents a pound. What is the percent increase?

3. A computer software retailer used a markup rate of **40%**.
Find the selling price of a computer game that cost the retailer **\$25**.

4. A golf shop pays its wholesaler **\$40** for a certain club, and then sells it to a golfer for **\$75**. What is the markup rate?

5. A shoe store uses a **40%** markup on cost.
Find the cost of a pair of shoes that sells for **\$63**.

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6. An item originally priced at **\$55** is marked **25%** off. What is the sale price?

7. An item that regularly sells for **\$425** is marked down to **\$318.75**.
What is the discount rate?

8. An item is marked down **15%**; the sale price is **\$127.46**.
What was the original price?

9. Growing up, you lived in a tiny country village. When you left for college, the population was **840**. You recently heard that the population has grown by **5%**. What is the present population?

10. Your friend diets and goes from **125** pounds to **110** pounds.
What was her percentage weight loss?

Extra Credit

11. Your boss says that his wife has put an **18 × 51** foot garden in along the whole back end of their back yard. He says that this has reduced the back-yard lawn area by **24%**. What are the total dimensions of his back yard? What are the dimensions of the remaining lawn area?