Proportional Relationships

Objective Introducing Proportions to Solve Percent Problems

Warm-Up

The regular price of a bathing suit is $89.99.

Estimate the sale price of the bathing suit for each of the following sales.

1. 70% off regular price   Sample worked out

Round $89.99 to $90

Since we take 70% off regular price, we multiple by 30% which is the remaining value of 100%

Convert 30% to a decimal $\frac{30}{100}$

$$90 \quad \times \quad \frac{30}{100} \quad = \quad \frac{2,700}{100}$$

2,750 ÷ 100 = 27

The bathing suit price cost $27 after 70% off

2. 30% off regular price

3. 50% off regular price

4. 25% off regular price

Need New Kicks?

A marketing department is creating signs for an upcoming shoe sale.

| HOLIDAY SHOE SALE 35% OFF the Regular Price	HOLIDAY SHOE SALE 65% Of Regular Price

1. Compare the two signs. What do you notice?

2. Which sign should the store use to advertise the shoe sale? Explain your reasoning.

3. The regular price of a pair of shoes is $59.99.
Estimate the sale price of the pair of shoes two different ways.

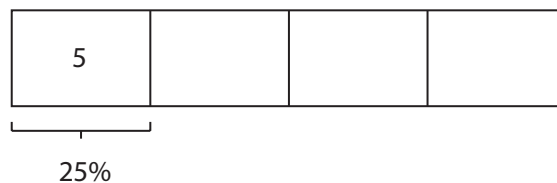Three percent scenarios are shown. Match each model to the appropriate scenario.

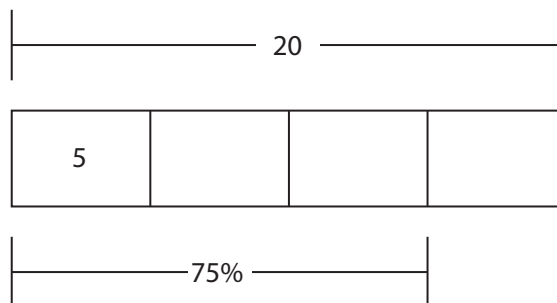**1. A shirt costs $20. If it was on sale for 75% off, what is the discount?**

a.

	28		

7	7	7	7

21
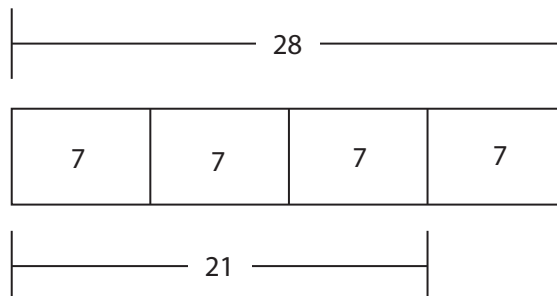
2. A skirt originally cost $28. Alicia pays $21 for the skirt during a sale. What percent does Alicia save with the sale?

b.

5			

25%

3. A ski hat is on sale for 25% off, which is $5 off. What is the original price of the ski hat?

c.

	20		

5			

75%

4. Use the appropriate model to solve each percent problem. Explain how you solved each

Corinne, Eduardo, and Adina each set up a proportion to solve four different percent problems.

Remember, you can write a percent as a proportion.

$$\frac{\text{part}}{\text{whole}} = \frac{\text{percent number}}{100}$$

1. Read each percent problem and analyze the corresponding student's work.

A shirt costs $20. If it is on sale for 75% off, what is the discount?

Corinne 👍

$$\frac{75}{100} = \frac{x}{20}$$

$$(75)(20) = 100x$$

$$1500 = 100x$$

$$\frac{1500}{100} = \frac{100x}{100}$$

$$15 = x$$

The discount is $15.

a. How did Corinne know where to place the 20 in her proportion?

A skirt originally cost $28. Alicia pays $21 for the skirt during a sale. What percent does Alicia save with the sale?

Eduardo 👍

$$\frac{x}{100} = \frac{21}{28}$$

$$28x = (100)(21)$$

$$28x = 2100$$

$$\frac{28x}{28} = \frac{2100}{28}$$

$$x = 75$$

Alicia paid 75% of the cost, so Alicia saved 25%.

b. How did Eduardo decide Alicia saved 25%?

A ski hat is on sale for 25% off, which is $5 off. What is the original price of the ski hat?

Adina 👎

$$\frac{25}{100} = \frac{x}{5}$$

$$(25)(5) = 100x$$

$$125 = 100x$$

$$\frac{125}{100} = \frac{100x}{100}$$

$$1.25 = x$$

c. Explain what Adina did incorrectly. Then, set up and solve the problem correctly.

All of the problems in the previous activity involved a sale or a **markdown**. To make money, businesses often buy products from a wholesaler or distributor for one amount and add to that amount to determine the price they use to sell the product to their customers.
This is called a **markup**.

The school store is selling spirit wear. They mark up all of the prices by 20% to sell to the community and students.

2. If the store's cost for a sweatshirt is $25, what is the customer's cost? Analyze the four student responses shown.

Dean 👎

$$\frac{20}{100} = \frac{x}{25}$$

$$5 = x$$

The customer's cost is $5.

Binh 👍

$$\frac{20}{100} = \frac{x}{25}$$

$$5 = x$$

The customer's cost is
$5 + $25 = $30.

Luke 👍

The new "whole" is the total cost, which is 20% more than the original 100%. I can multiply the store cost by 120%, or 1.20.

$$25(1.20) = 30$$

The customer's cost is $30.

Lahari 👍

The original cost is now the part.

$$\frac{100}{120} = \frac{25}{x}$$

$$30 = x$$

The customer's cost is $30.

a. Compare Dean's method to Binh's method.

b. Compare Luke's method to Lahari's method.

3. Use the method(s) of your choice to complete the table of the store's cost and the customer's cost for the spirit wear

	Store's Cost	Customer's Cost
T-shirt	$8	
Face Tattoos		$4.50

LESSON 4.1a
Markups and Markdowns

Objective   Introducing Proportions to Solve Percent Problems

Solve each percent problem. Show your work.

1. The $199.99 game console Amy purchased was on sale for 10% off. How much did Amy pay?

2. A computer is normally $899 but is discounted to $799. What percent of the original price does Shawn pay?

3. If Fernando paid $450 for a netbook that was 75% of the original price, what was the original price?

4. Fantasy-N-Fun sells gaming cards for $9.99 but they pay only $6.75 per card. What is the percent markup?

5. Dontrelle received 30% off when he purchased a rare book regularly priced at $96.50. How much did Dontrelle pay?

6. Brittany is selling car magnets. She purchases them for $7.50 each and marks up the price by 30%. How much is Brittany planning to charge?