Grade	5	NS	1.2	,
Grauc	$\sim$	110		

Grade 6 NS 1.4

- Use three approaches to find the answer.
- How might a student obtain each of the answers?

Review: Grade 3 AF 1.1 Other:

# **Using Bar Models to Solve Percent Word Problems**

Bar models can be used to provide an alternative way to visualize percent problems that involve discount, sale price, and markup. Bar models help students build upon their prior understanding of percentages and apply that knowledge to solving word problems.

Today's Objective: Using bar models to solve percent problems involving discount, sale price, and markup.

Standards: Grade 6 NS 1.4 and Grade 7 NS 1.7

Example 1:

Your Turn 1: Problem involving discount
A jacket originally costs \$70. Wilasha bought i.2 (n) -08.hahaha 30% [(())5 ([(())5 (((\$7H[(A) -0ow[(A) -0 m. W) 0u

# Example 2: Problem involving discount and sale price

The price of a new pair of shoes is \$40. If there is a 20% discount on all shoes, what is the final sale price?

Bar Model	Method 2	Method 3
	(Proportions)	(Direct Translation)
	What is 20% of \$40?	What is 20% of \$40?

# Your Turn 2a

#### Your Turn 2a: Problem involving discount and sale price (solution)

An e-book reader regularly sells for \$220. It is on sale for 75% off. What is the sale price of the reader? **Bar Model** Method 2 Method 3 (Direct Translation) (Proportions) What is 75% of \$220? What is 75% of \$220? 75% of \$220 is \$165 \$220 - \$165 = \$55∴ the sale price is \$55 75% of \$220 is \$165 (discount) 25% of \$220 is \$55 (sale price) ∴ the sale price is \$55 75% of 🗳 75% of \$220 \$220 - \$ 20 - \$16∴ the sal sale pri

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# Your Turn 2b: Problem involving discount and sale price

A pair of noise-canceling headphones regularly sells for \$116. They are on sale for 75% off. What is the sale price of the headphones?

Bar Model	Method 2 (Proportions)	Method 3 (Direct Translation)

### **Your Turn 2b: Problem involving discount and sale price (solution)**

A pair of noise-canceling headphones regularly sells for \$116. They are on sale for 75% off. What is the sale price of the headphones?

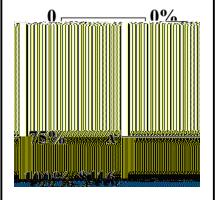
#### **Bar Model**

75% of \$116 is \$87 (discount) 25% of \$116 is \$29 (sale price)

∴ the sale price is \$29

# Method 2 (Proportions)

What is 75% of \$116?



$$\frac{x}{116} = \frac{75}{100}$$

$$\frac{x}{116} = \frac{3}{4}$$

$$4 \cdot x = 3 \cdot 116$$

$$4x = 348$$

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

75% of \$116 is \$87 (discount)

original price discount

Method 3 (Direct Translation)

What is 75% of \$116?

75% of \$116 is \$87

$$$116 - $87 = $29$$

: the sale price is \$29

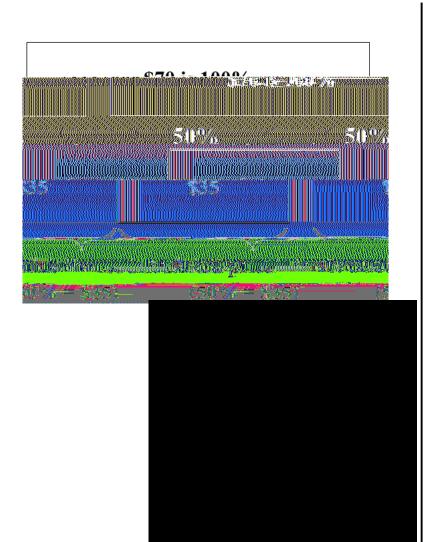
75% of \$116 is \$87

\$116 - \$87 = \$29

#### **Example 3a: Problem involving multiple discounts**

Jorge bought a watch on sale for 50% off the original price and another 50% off the discounted price. If the watch originally costs \$70, what was the final sale price that Jorge paid for the watch?

#### **Bar Model**



: the final sale price is \$17.50

# Method 2 (Direct Translation)

What is 50% of \$70?

$$X = \frac{50}{100} \cdot 70$$

$$X = \frac{1}{2} \cdot 70$$

$$X = \frac{2 \cdot 35}{2}$$

$$X = 35$$

50% of \$70 is \$35 (1st discount)

$$$70 - $35 = $35 (1^{st} \text{ discounted price})$$

What is 50% of \$35?

$$x = \frac{50}{100} \cdot 35$$

$$x = \frac{1}{2} \cdot 35$$

$$x = \frac{35}{2}$$

$$x = 17.5$$

50% of \$35 is \$17.50 (2<sup>nd</sup> discount)

$$$35 - $17.50 = $17.50$$
 (final sale price)

∴ the final sale price is \$17.50

#### **Example 3b: Problem involving multiple discounts**

Jorge bought a watch on sale for 25% off the original price and another 75% off the discounted price. If the watch originally costs \$64, what was the final sale price that Jorge paid for the watch?

#### **Bar Model**

Method 2 (Direct Translation)

What is 25% of \$64?

$$= \frac{25}{100} \cdot 64$$

$$= \frac{1}{4} \cdot 64$$

$$= \frac{4 \cdot 16}{4}$$

$$= 16$$

25% of \$64 is \$16 (1st discount)

 $$64 - $16 = $48 (1^{st} \text{ discounted price})$ 

What is 75% of \$48?

$$x = \frac{75}{100} \cdot 48$$

$$x = \frac{3}{4} \cdot 48$$

$$x = \frac{3 \cdot 4 \cdot 12}{4}$$

$$x = 36$$

75% of \$48 is \$36 (2<sup>nd</sup> discount)

$$$48 - $36 = $12$$
 (final sale price)

∴ the final sale price is \$12

∴ the final sale price is \$12

# **Your Turn 3: Problem involving multiple discounts (solution)**

Antonia is buying a space heater that regularly costs \$90. It is on sale for 40% off with an additional 25% off the discounted price. What is the final sale price of the heater?

**Bar Model** 

Method 2 (Direct Translation)

What is 40% of \$90?

40% of \$90 is \$36 (1st discount)

 $$90 - $36 = $54 (1^{st} \text{ discounted price})$ 

What is 25% of \$54?

25% of \$54 is \$13.50 (2<sup>nd</sup> discount)

\$54 - \$13.50 = \$40.50 (final sale price)

∴ the final sale price is \$40.50

: the final sale price is \$40.50

# **Example 4: Problem involving markup**

$$\frac{x}{96} = \frac{25}{100}$$

$$\frac{x}{96} = \frac{1}{4}$$

$$96 \quad \frac{x}{96} = 96 \quad \frac{1}{4}$$

$$x = \frac{96}{4}$$

$$x = \frac{4 \cdot 24}{4}$$

$$x = 24$$

# Your Turn 4: Problem involving markup

An amusement park recently increased its family season pass by 22%. If the original price of the pass was \$150, what is the cost of the pass after markup?

Bar Model Method 2

$$x = 22\% \cdot $150$$
  
 $x = 22$ 

# Extension 1: Problem involving discount and tax

Saydi is buying a pair of jeans that regularly cost \$60. They are on sale for 40% off. If the tax rate is 9%, what is the sale price of the jeans including tax?

Bar Model	Method 2 (Direct Translation)

# **Extension 1: Problem involving discount and tax (solution)**

Saydi is buying a pair of jeans that regularly cost \$60. They are on sale for 40% off. If the tax rate is 9%, what is the sale price of the jeans including tax?

Bar Model Method 2