Lesson 3.3/3.4 Percents, Proportions, Problem Solving

Thursday, November 7, 2024 8:11 AM

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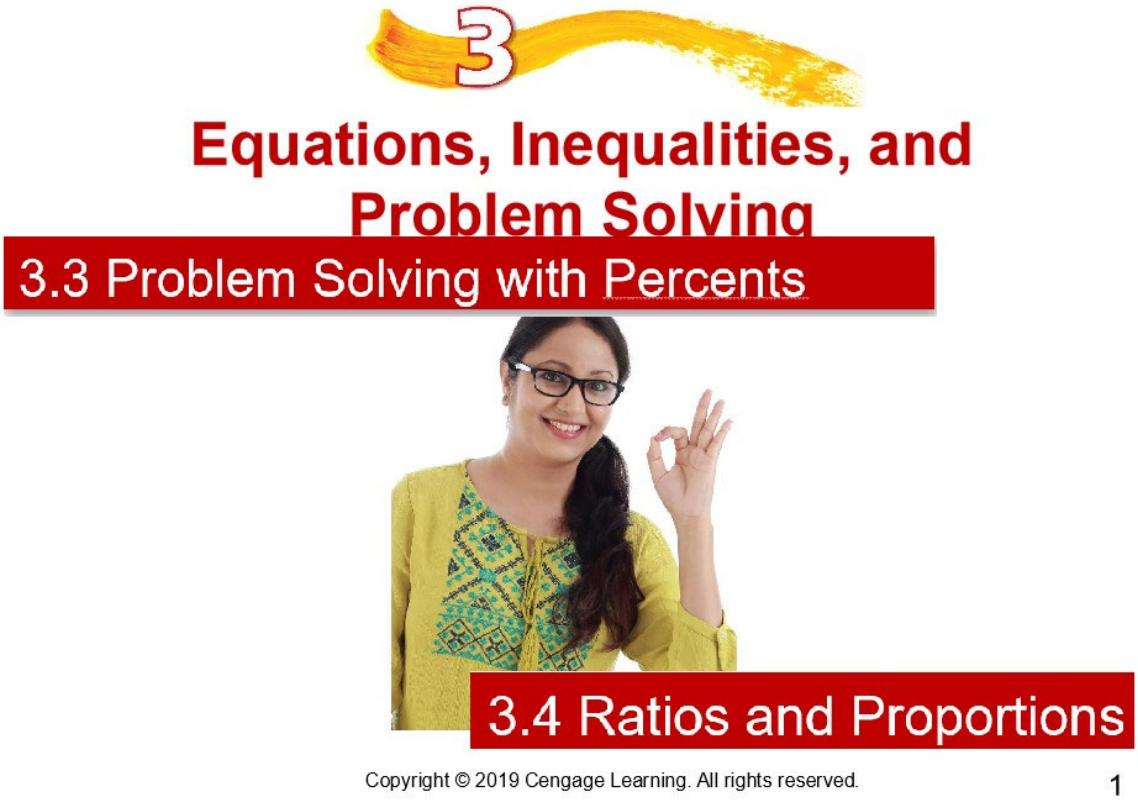
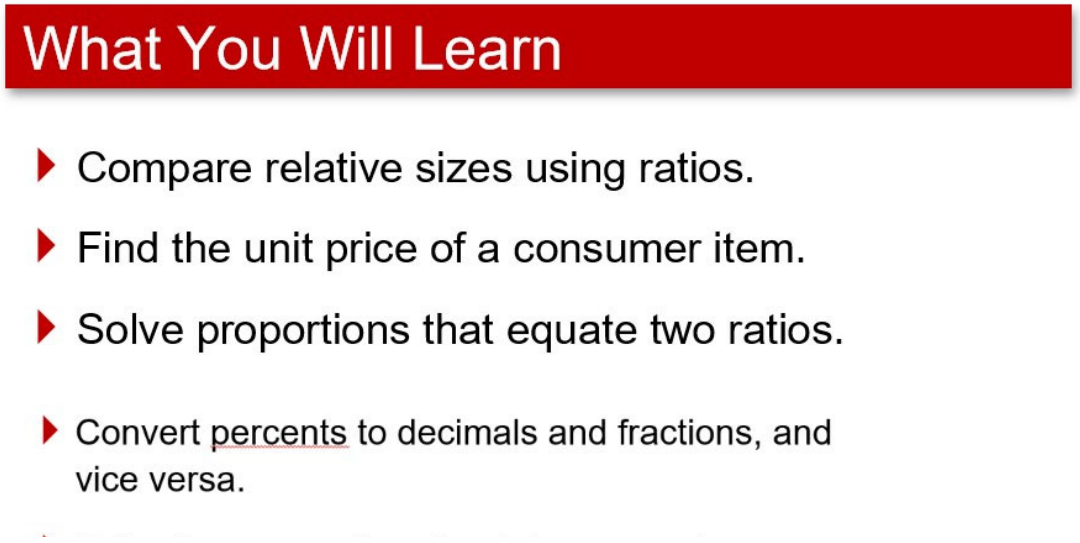
Lesson 3.3 and 3.4 M...





vice versa.

- Solve linear equations involving percents.
- Solve problems involving markups and discounts.

Converting Percents to Decimals and Fractions

1. Convert 3.5% to a decimal. .035 3.5/100

2. Convert 55% to a fraction.

$\frac{55}{100} \div \frac{5}{5} = \frac{11}{25}$

a. What number is 30% of 70? $0.30 \times 70 = 21$

b. A union negotiates for a cost-of-living raise of 7%. What is the raise for a union member whose salary is $40,240? What is the person's new salary?

$+ \frac{\times 0.07}{2816.80}$

43,056 80

Solving Proportions

a. $\frac{50}{x} = \frac{2}{28}$

$\frac{2x}{2} = \frac{1400}{2}$

$x = 700$

b. $\frac{(x-2)}{5} = \frac{4}{3}$

$3(x-2) = 4(5)$

$3x - 6 = 20$

$+6 \quad +6$

$x = 700$

$3x - 6 = 20$
$+6 \quad +6$
$\frac{3x}{3} = \frac{26}{3}$
$x = 8\frac{1}{3}$

Solving Percent Equations

a. What number is 30% of 70?

b. A union negotiates for a cost-of-living raise of 7%. What is the raise for a union member whose salary is $40,240? What is the person's new salary?

Solution:

Solving Markup Problems

a. The costs is $45. The markup rate is 55%. What is the selling price? $45 \times 0.55 = 24.75$

$45 + 24.75 = 69.75$

b. The selling price is $98. The markup rate is 60%. What is the cost?

c. The selling price is $60. The cost is $24. The markup rate is?

Solution:

(c) $60 = 24 + r(24)$
$-24 \quad -24$

$\frac{36}{24} = \frac{24r}{24}$
$r = 1.5$

Selling price = Cost + Markup — Substitute known values.

(b) $98 = 1x + .60x$ $x = 61.25$

Selling price = Cost + Markup

Substitute known values.

b. $98 = 1x + .60x$

$\frac{98}{1.60} = \frac{1.60x}{1.60}$

$x = 61.25$

24 24

$r = 1.5$

$\times 100$

150%

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Solving Discount Problems

a. The original price of a lawn mower was $199.99. During a midsummer sale, the lawn mower is on sale for $139.99. What is the discount rate?

b. A drug store advertises 40% off the prices of all sunscreen products. The original price of a bottle of sunscreen is $3.49. What is the sale price?

Solution:

a. Verbal Model: Discount = Discount rate · Original price

A Subtract $199.99 - 139.99 = 60$

divide by original amount $\frac{60}{199.99} = 0.3$

$\times 100$

30%

B $3.49 \times 0.40 = 1.40$

-1.40

2.09

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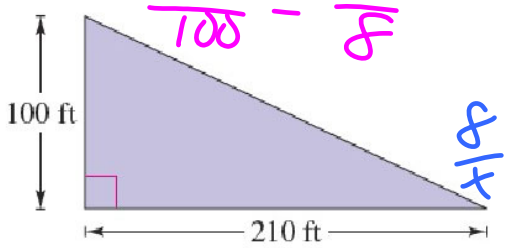
Geometry: Using Similar Triangles

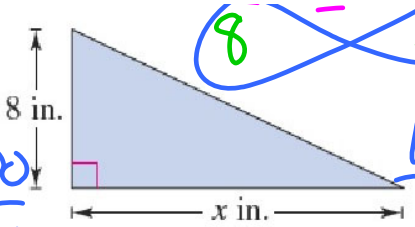
A triangular lot has perpendicular sides with lengths of 100 feet and 210 feet. You are making a proportional sketch of this lot using 8 inches as the length of the shorter side. How long should you make the longer side?

$\frac{210}{100} = \frac{x}{8}$

$\frac{100}{8} = \frac{210}{x}$



Triangular lot



Sketch

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Proportions Word Problems

You are driving from New York to Phoenix, a trip of 2450 miles. You begin the trip with a full tank of gas, and after traveling 424 miles, you refill the tank for $58. Assuming gas prices will be the same for the duration of your trip, how much should you plan to spend on gasoline for the entire trip?

Solution:

Verbal Model:

$$\frac{\text{Cost for entire trip}}{\text{Cost for one tank}} = \frac{\text{Miles for entire trip}}{\text{Miles for one tank}}$$

Labels: Cost of gas for entire trip = x (dollars)
Cost of gas for one tank = 58 (dollars)
Miles for entire trip = 2450 (miles)
Miles for one tank = 450 (miles)

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