Percent of Change

Additional Examples — Lesson 4-4

1 EXAMPLE The price of a skirt decreased from $32.95 to $28.95. Find the percent of decrease.

$$\text{percent of decrease} = \frac{\text{amount of change}}{\text{original amount}}$$ → Subtract

$= \frac{32.95 - 28.95}{32.95}$ Subtract to find the amount of change. Substitute the original amount.

$= \frac{4}{32.95}$ Simplify the numerator.

Then move decimal → 2

≈ 0.12 or 12% Write as a decimal and then as a percent.

The price of the skirt decreased by about 12%.

2 EXAMPLE Between 1940 and 1980, the federal budget increased from $9.5 billion to $725.3 billion. What was the percent of increase in the federal budget?

$$\text{percent of increase} = \frac{\text{amount of change}}{\text{original amount}}$$ → Subtract

$= \frac{725.3 - 9.5}{9.5}$ (100) Substitute.

$= \frac{715.8}{9.5}$ (100) Then Simplify the numerator.

move decimal → 2

≈ 75.35 or 7535% Write as a decimal and then as a percent.

The federal budget increased by nearly 7535%.

3 EXAMPLE You read the bathroom scale as 122 lb. What is your greatest possible error?

The scale is read to the nearest 1 lb, so the greatest possible error is one half of 1 lb, or 0.5 lb.

4 EXAMPLE When a garden plot was measured, the dimensions were 156 in. × 84 in. Use the greatest possible error to find the minimum and maximum possible areas.

Both measurements were made to the nearest whole inch, so the greatest possible error is 0.5 in. The length could be as little as 155.5 in. or as great as 156.5 in. The width could be as little as 83.5 in. or as great as 84.5 in. Find the minimum and maximum areas.

Minimum Area	Maximum Area
155.5 in. × 83.5 in. = 12,984.25 in.^{2}	156.5 in. × 84.5 in. = 13,224.25 in.^{2}

The minimum area is 12,984.25in.^{2}, and the maximum area is 13,224.25 in.^{2}.

5 EXAMPLE Suppose you measure a library book and record its width as 17.6 cm. Find the percent of error in your measurement.

Since the measurement is to the nearest 0.1 cm, the greatest possible error is 0.05 cm.

$$\text{percent error} = \frac{\text{greatest possible error}}{\text{measurement}}$$ Use the percent error formula.

$= \frac{0.05}{17.6}$ Substitute.

≈ 0.0028409091 Divide.

$\approx 0.3\%$ Round and write as a percent.

The percent error is about 0.3%.

6 EXAMPLE A small jewelry box measures 7.4 cm by 12.2 cm by 4.2 cm. Find the percent error in calculating its volume.

The measurements are to the nearest 0.1 cm. The greatest possible error is 0.05 cm.

as measured	maximum value	minimum value
$V = \ell \cdot w \cdot h$	$V = \ell \cdot w \cdot h$	$V = \ell \cdot w \cdot h$
$= 7.4 \cdot 12.2 \cdot 4.2$	$= 7.45 \cdot 12.25 \cdot 4.25$	$= 7.35 \cdot 12.15 \cdot 4.15$
$\approx 379.18 \text{ cm}^3$	≈ 387.87	≈ 370.61

Possible Error: maximum − measured: $387.87 - 379.18 = 8.69$; measured − minimum: $379.18 - 370.61 = 8.57$

Use the difference that shows the greatest possible error to find the percent error.

$$\text{percent error} = \frac{\text{greatest possible error}}{\text{measurement}}$$ Use the percent error formula.

$$= \frac{387.87 - 379.18}{379.18}$$ Substitute.

$$= \frac{8.69}{379.18}$$ Simplify the numerator.

≈ 0.0229178754 Write as a decimal.

$\approx 2\%$ Round and write as a percent.

The percent error is about 2%.