Expressing Fractions as Decimals and Percents

- To write a fraction as a decimal, divide the numerator by the denominator. To write a decimal as a fraction, write the decimal as a fraction with denominator of 10, 100, 1000, … . Then simplify if possible.

Example 1 **Write each fraction as a decimal.**

a. $\frac{5}{8}$

$\frac{5}{8} = 5 \div 8$

$= 0.625$

b. $\frac{3}{5}$

$\frac{3}{5} = 3 \div 5$

$= 0.6$

c. $\frac{1}{3}$

$\frac{1}{3} = 1 \div 3$

$= 0.333\ldots$

Example 2 **Write each decimal as a fraction.**

a. **0.4**

$0.4 = \frac{4}{10}$ or $\frac{2}{5}$

b. **0.005**

$0.005 = \frac{5}{1000}$ or $\frac{1}{200}$

c. **0.98**

$0.98 = \frac{98}{100}$ or $\frac{49}{50}$

- To write a fraction for a repeating decimal, use the method in Example 3 below.

Example 3 **Write each decimal as a fraction.**

a. **$0.\overline{3}$**

Let $N = 0.\overline{3}$ or $0.333\ldots$

Then $10N = 3.\overline{3}$ or $3.333\ldots$

$10N = 3.333\ldots$

$-1N = 0.333\ldots$ Subtract $1N$ from $10N$.

$9N = 3$

$N = \frac{3}{9}$ or $\frac{1}{3}$

So, $0.\overline{3} = \frac{1}{3}$.

b. **$0.\overline{72}$**

Let $N = 0.\overline{72}$ or $0.7272\ldots$

Then $100N = 72.7272\ldots$

$100N = 72.7272$

$-1N = 00.7272$ Subtract $1N$ from $100N$.

$99N = 72$

$N = \frac{72}{99}$ or $\frac{8}{11}$

So, $0.\overline{72} = \frac{8}{11}$.

- To write a decimal as a percent, multiply by 100 and add the % symbol. Recall that to multiply by 100, you can move the decimal point two places to the right.

- To write a percent as a decimal, divide by 100 and remove the % symbol. Recall that to divide by 100, you can move the decimal point two places to the left.

Example 4 **Write each decimal as a percent.**

Multiply by 100 and add the % symbol.

a. **0.35**

$0.35 = 0.35$

$= 35\%$

b. **0.06**

$0.06 = 0.06$

$= 6\%$

c. **0.008**

$0.008 = 0.008$

$= 0.8\%$

Example 5 **Write each percent as a decimal.**

Divide by 100 and remove the % symbol.

a. **36%**

$36\% = 36\%$

$= 0.36$

b. **9%**

$9\% = 09\%$

$= 0.09$

c. **120%**

$120\% = 120\%$

$= 1.2$

- To write a fraction as a percent, express the fraction as a decimal. Then express the decimal as a percent.

Example 6 **Write each fraction as a percent. Round to the nearest tenth of a percent, if necessary.**

a. $\frac{1}{8}$

$\frac{1}{8} = 0.125$

$= 12.5\%$

b. $\frac{2}{3}$

$\frac{2}{3} = 0.6666\ldots$

$= 66.7\%$

c. $\frac{3}{600}$

$\frac{3}{600} = 0.005$

$= 0.5\%$

- To write a percent as a fraction, express the percent as a decimal. Then express the decimal as a fraction. Simplify if possible.

Example 7 **Write each percent as a fraction.**

a. 30%

$30\% = 0.30$

$= \frac{30}{100}$ or $\frac{3}{10}$

b. 140%

$140\% = 1.4$

$= \frac{14}{10}$ or $1\frac{2}{5}$

c. 0.2%

$00.2\% = 0.002$

$= \frac{2}{1000}$ or $\frac{1}{500}$