

Key

1. (5 pts each, 15 points total) Solve each of the following proportions.

a) $\frac{2}{3} = \frac{10}{t}$

$$2t = 10 \times 3$$

$$\frac{2t}{2} = \frac{30}{2}$$

$$\boxed{t = 15}$$

b) $\frac{4}{5} = \frac{k}{9}$

$$4 \cdot 9 = 5k$$

$$\frac{36}{5} = \frac{5k}{5}$$

$$\boxed{k = \frac{36}{5}}$$

c) $\frac{x+2}{x-2} = \frac{4}{8}$

$$8(x+2) = 4(x-2)$$

$$\begin{array}{r} 8x + 16 = 4x - 8 \\ -4x \quad -4x \end{array}$$

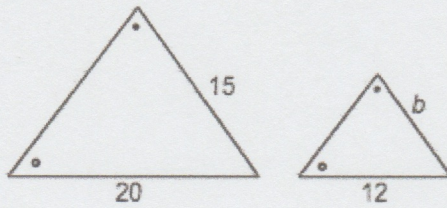
$$\begin{array}{r} 4x + 16 = -8 \\ -16 \quad -16 \end{array}$$

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

$$\boxed{x = -6}$$

2. (5 pts each, 10 points total) Each pair of figures is similar. Find the length of x.

a)



$$\frac{\text{side of Big Triangle}}{\text{Base of Big Triangle}} = \frac{\text{side of Small Triangle}}{\text{Base of small Triangle}}$$

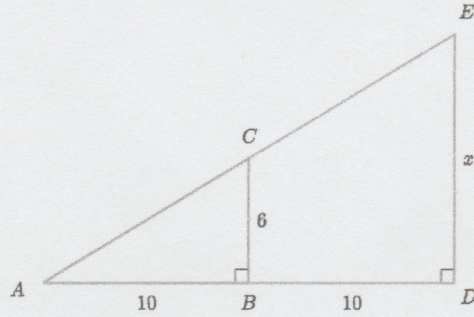
$$\frac{15}{20} = \frac{b}{12}$$

$$15 \cdot 12 = 20b$$

$$\frac{180}{20} = \frac{20b}{20}$$

$$\boxed{b = 9}$$

b)



$$\frac{\text{Height of big}}{\text{Base of big}} = \frac{\text{Height of small}}{\text{Base of small}}$$

$$\frac{x}{10+10} = \frac{6}{10}$$

~~$$\frac{x}{20} = \frac{6}{10}$$~~

$$10x = 20 \cdot 6$$

$$\frac{10x}{10} = \frac{120}{10}$$

$$x = 12$$

3. (5 pts each, 15 points total) Solve each problem.

a) What is 36% of 80?

$$x = 0.36 * 80$$

$$x = 28.8$$

b) What percent of 90 is 27?

$$x\% * 90 = 27$$

$$\frac{90x\%}{90} = \frac{27}{90}$$

$$x\% = \frac{27}{90} = 0.3$$

$$x\% = 0.30 * 100\%$$

$$x = 30\%$$

c) 84% of what is 21?

$$0.84 * x = 21$$

$$\frac{0.84x}{0.84} = \frac{21}{0.84}$$

$$x = 25$$

4. (5 pts each, 20 points total) Find each percent of change. Describe the percent of change as an increase or decrease.

a) \$88 to \$120

$$\frac{\text{new} - \text{old}}{\text{old}} * 100\% \quad \text{or} \quad \frac{\text{last} - \text{first}}{\text{first}} * 100\%$$

$$\frac{120 - 88}{88} * 100\% = \frac{32}{88} * 100\%$$

$$0.364 * 100\% =$$

36.4% increase

increase since change is positive

b) 45 cm to 25 cm

$$\frac{25 - 45}{45} * 100\% = \frac{-20}{45} * 100\%$$

$$= -0.444 * 100\%$$

decrease since change is negative

$$= -44.4\%$$

or **44.4% decrease**

c) 1240 mi to 560 mi

$$\frac{560 - 1240}{1240} * 100\% = \frac{-680}{1240} * 100\%$$

$$= -0.548 * 100\%$$

$$= -54.8\%$$

or **54.8% decrease**

d) In 1980, the average price of a movie ticket was \$2.69. In 2017, the average price was \$8.65. What was the percent of change?

$$\frac{8.65 - 2.69}{2.69} * 100\% = \frac{5.96}{2.69} * 100\%$$

$$= 2.22 * 100\%$$

222% increase

5. (5 pts each, 20 points total) Since 1996, there have been 24 Super Bowls. Of these, the New England Patriots have represented the AFC 10 times, the Denver Broncos 4 times, and the Pittsburgh Steelers 4 times. Use this information to answer the following:

- a) What is the probability the New England Patriots would represent the AFC during this time?

$$\frac{10}{24} = \boxed{\frac{5}{12} \text{ or } 41.7\%}$$

Note: May give extra credit on exam if "Go Pats" is written on a page. Go Pats!

- b) What is the probability that the Denver Broncos or Pittsburgh Steelers would represent the AFC during this time?

$$\frac{4+4}{24} = \frac{8}{24} = \boxed{\frac{1}{3} \text{ or } 33.3\%}$$

- c) What is the probability that another team other than the New England Patriots, Denver Broncos or Pittsburgh Steelers would represent the AFC during this time?

$$\frac{24 - (10 + 4 + 4)}{24} = \frac{24 - 18}{24} = \frac{6}{24} = \boxed{\frac{1}{4} \text{ or } 25\%}$$

- d) What is the probability that Pittsburgh was not a representative during this time?

$$\frac{24 - 4}{24} = \frac{20}{24} = \boxed{\frac{5}{6} \text{ or } 83.3\%}$$

6. (5 pts each, 10 points total) Suppose Kyle has a bag of candy containing 8 Snickers bars, 6 Kit-Kats, and 4 Reese's Cups. Find each probability.

- a) P(Kit-Kat then Reese's Cup) with replacing

$$\begin{array}{c} \downarrow \qquad \downarrow \\ \frac{6}{18} * \frac{4}{18} \\ \frac{1}{3} * \frac{2}{9} = \boxed{\frac{2}{27}} \end{array}$$

Snickers Prob = $\frac{8}{18}$

Kit-Kat Prob = $\frac{6}{18}$

Reese's Prob = $\frac{4}{18}$

Please try to remember to reduce!!

- b) P(Snickers then Kit-Kat) with replacing

$$\begin{array}{c} \downarrow \qquad \downarrow \\ \frac{8}{18} * \frac{6}{18} \\ \frac{4}{9} * \frac{1}{3} = \boxed{\frac{4}{27}} \end{array}$$

- c) P(Reese's Cup then Reese's Cup) without replacing

$$\begin{array}{c} \downarrow \qquad \downarrow \\ \frac{4}{18} \cdot \frac{3}{17} \\ \frac{2}{9} \cdot \frac{3}{17} = \frac{6}{153} = \boxed{\frac{2}{51}} \end{array}$$

Note: If you don't replace the Reese's Cup you select, you will have one less Reese's in the bag and one less from the total!

- d) P(Kit-Kat then Reese's Cup) without replacing

$$\begin{array}{c} \downarrow \qquad \downarrow \\ \frac{6}{18} * \frac{4}{17} \\ \frac{1}{3} * \frac{4}{17} = \boxed{\frac{4}{51}} \end{array}$$