1 Percent

Example:
What is 28% of 286?

Step 1. Change the 28% to a decimal equivalent:

$$28\% \div 100 = 0.28$$

Step 2. Multiply $286 \times 0.28 = 80$
Thus 28% of 286 is 80.

Example: A filter bed will expand 25% during backwash. If the filter bed is 36 inches deep, how deep will it be during backwash?

Step 1. Change the percent to a decimal.

$$25\% \div 100 = 0.25$$

Step 2. Add the whole number 1 to this value.

$$1 + 0.25 = 1.25$$

Step 3. Multiply times the value.

$$36 \text{ in } \times 1.25 = 45 \text{ inches}$$

1. What is 20% of 250?
   Solution:
   $20\% = \dfrac{20}{100} = 0.2 \implies 20\%\ of\ 250 = 0.2 * 250 = \boxed{50}$
2. What percent is 0.4 of 4?
   Solution:
   $x\% = \dfrac{x}{100} \implies 0.4 = \dfrac{x}{100} * 4 \implies x = \dfrac{0.4 * 100}{4} = \boxed{10\%}$

1.1 Percentage Concentrations

Example 1: A chlorine solution was made to have a 4% concentration. It is often desirable to determine this concentration in mg/L. This is relatively simple: the 4% is four percent of a million.
To find the concentration in mg/L when it is expressed in percent, do the following:

1. Change the percent to a decimal.

$$4\% \div 100 = 0.04$$

3. Multiply times a million.

$$0.04 \times 1,000,000 = 40,000\text{mg/L}$$

We get the million because a liter of water weighs 1,000,000mg.1mg in 1 liter is 1 part in a million parts (ppm).1% = 10,000mg/L.

Example 2: How much 65% calcium hypochlorite is required to obtain 7 pounds of pure chlorine?

65% implies that in every lb of calcium hypochlorite has 65% lbs of available chlorine.

Therefore, $\frac{\text{0.65 lbs available chlorine}}{\text{lb of calcium hypochlorite}}$ or conversely $\frac{\text{lb of calcium hypochlorite}}{\text{0.65 lbs available chlorine}}$

$$\implies \text{lbs calcium hypchlorite required} = \frac{\text{lb of calcium hypochlorite}}{\cancel{\text{0.65 lbs available chlorine}}} * \cancel{\text{7 lb of available chlorine}}$$

$$= \boxed{\text{10.8 lbs of calcium hypochlorite with 65\%available chlorine is required}}$$

1. 25% of the chlorine in a 30-gallon vat has been used. How many gallons are remaining in the vat?
   Solution:
   Amount of chlorine remaining in the vat is 100%-25%=75%
   Gallons of chlorine remaining in the vat: $30 * 0.75 = \boxed{22.5\ gallons}$

2. The annual public works budget is $147,450. If 75% of the budget should be spent by the end of September, how many dollars are to be spent? How many dollars will be remaining?

   Solution:
   Amount to be spent = $147,450*0.75 = $\boxed{\$110,812.50}$

   Amount remaining = $ 147,450 - 110,812.50 = $\boxed{\$36,367.50}$

3. A 75 pound container of calcium hypochlorite has a purity of 67%. What is the actual weight of the calcium hypochlorite in the container?

   Solution:
   Note: Calcium Hypochlorite can be written as $Ca(OCl)_2$
   $75\ lbs\ Ca(OCl)_2\ -\ product\ in\ container * \frac{0.67\ lbs\ Ca(OCl)_2}{lb\ Ca(OCl)_2\ -\ product\ in\ container} = \boxed{50.25\ lbs\ Ca(OCl)_2}$

4. 3/4 is the same as what percentage?
   $\frac{3}{4} = 0.75\ which\ is\ \frac{75}{100} = \boxed{75\%}$

5. An operator mixes 40 lb of lime in a 100-gal tank containing 80 gal of water. What is the percent of lime in the slurry? Solution: