How many grams of sucrose should be used in preparing 1010mL 60% w/v solution?

$$\underline{1010mL} \times \left(\frac{60g}{100mL} \right) = \underline{\underline{606g}}$$

Express 0.02% w/v in ratio strength.

$$z = \frac{1}{0.02\%} = \frac{1}{0.0002} = 5000$$

$$\underline{\underline{1:5000}}$$

Convert 1:3500 w/v to percentage and mg percentage.

1:3500 w/v means that there is 1g per 3500mL.

$$\frac{1g}{3500mL} \times 100\% = \underline{\underline{0.029\%}}$$

$$\frac{1g}{3500mL} \times \left(\frac{1000mg}{1g} \right) \times 100\% = \underline{\underline{29mg\%}}$$

A pharmacist needs to prepare 1000mL of stock solution of 1:3000 w/v medication. How many grams of the drug are needed?

$$\underline{1000mL\ solution} \times \left(\frac{1g\ drug}{3000mL\ solution} \right) = \underline{\underline{0.33g}}$$

A pharmacist needs to prepare a stock solution with a ratio strength of 1:160 w/v of NaCl in water. The stock solution is made by dissolving NaCl tablets each containing 2.25g of NaCl in enough water to make the final solution 1800mL. How many tablets does the pharmacist need to use?

$$\underline{1800mL\ solution} \times \left(\frac{1g\ NaCl}{160mL\ solution} \right) \times \left(\frac{1\,tablet}{2.25g\ NaCl} \right) = \underline{\underline{5\,tablets}}$$

How many mL of solution can the pharmacist make with 2 tablets of NaCl?

$$\underline{2\,tablets} \times \left(\frac{2.25g\ NaCl}{1\,tablet} \right) \times \left(\frac{160mL\ solution}{1g\ NaCl} \right) = \underline{\underline{720mL\ solution}}$$

If the solution exists as a 1:1000 w/v ratio, how many mL can the pharmacist make with 2 tablets of NaCl?

$$\underline{2\ tablets} \times \left(\frac{2.25g\ NaCl}{1\ tablet} \right) \times \left(\frac{1000mL\ solution}{1g\ NaCl} \right) = \underline{\underline{4500mL\ solution}}$$

How many mL of a 1:500 w/v stock solution should be used in preparing 5L of a 1:2500 w/v solution?

Label each of the variables.

$C_1 = {}^{1}\!/_{500}\, w/v \qquad Q_1 = ??$

$C_2 = {}^{1}\!/_{2500}\, w/v \qquad Q_2 = 5L = 5000mL$

Write out the equation and rearrange to solve for Q_1.

$C_1 Q_1 = C_2 Q_2$

$$Q_1 = \frac{C_2 Q_2}{C_1} = \frac{\left({}^{1g}\!/_{2500mL} \right) \times (5000mL)}{\left({}^{1g}\!/_{500mL} \right)} = \underline{\underline{1000mL}}$$

If 5mL of solution A is diluted to 500mL the final solution will be 1:2000 w/v silver nitrate. What was the initial concentration?

Label each of the variables.

$C_1 = ?? \qquad Q_1 = 5mL$

$C_2 = {}^{1}\!/_{2000}\, w/v \qquad Q_2 = 500mL$

Write out the equation and rearrange to solve for C_1.

$C_1 Q_1 = C_2 Q_2$

$$C_1 = \frac{C_2 Q_2}{Q_1} = \frac{\left({}^{1g}\!/_{2000mL} \right) \times (500mL)}{5mL} = \underline{\underline{0.05 \frac{g}{mL} = {}^{1}\!/_{20}\, w/v}}$$

How much silver nitrate should be used in preparing 100mL of solution A?

$$\underline{100mL} \times \left(\frac{1g}{20mL} \right) = \underline{\underline{5g}} \quad or$$

$$\underline{100mL} \times \left(\frac{0.05g}{1mL} \right) = \underline{\underline{5g}}$$

Drug A is prepared in a concentration of 4% w/v. If 10mL is diluted to 2 fl oz, what is the final concentration in ratio strength?

Label each of the variables.

$C_1 = 4\% w/v \qquad Q_1 = 10mL$

$C_2 = ? \qquad Q_2 = \underline{2\ floz} \times \left(\frac{28.41mL}{1\ floz} \right) = 56.82mL$

Write out the equation and rearrange to solve for C_2.

$$C_1Q_1 = C_2Q_2$$

$$C_2 = \frac{C_1Q_1}{Q_2} = \frac{\left(4g/100mL\right)\times(10mL)}{56.82mL} = \underline{\underline{0.00704\frac{g}{mL} = 0.704\% = 1/142\, w/v}}$$

If 1tsp of a 60mL NaCl solution is diluted to 500mL to yield a 1:1500 w/v solution, how many grams of NaCl were in the initial solution?

Label each of the variables. Remember that we're only using 1 tsp of the first solution

$C_1 = ??$ $\qquad$ $Q_1 = \frac{1tsp}{}\times\left(\frac{5mL}{1tsp}\right) = 5m$

$C_2 = 1g/1500\ mL\ w/v$ $\qquad$ $Q_2 = 500\ mL$

Before we can determine the number of grams, we need to determine the initial concentration of the 60mL solution. Write out the equation and rearrange to solve for C_1.

$$C_1Q_1 = C_2Q_2$$

$$C_1 = \frac{C_2Q_2}{Q_1} = \frac{\left(1g/1500mL\right)\times(500mL)}{5mL} = 1g/15mL \text{ or } 6.67\%w/v$$

We want to determine the number of grams NaCl in 60mL of a solution with this concentration. You can use the ratio or the percent, whichever is easier. You'll get the same answer.

$$\frac{60mL\ solution}{}\times\left(\frac{1g\ NaCl}{15mL\ solution}\right) = \underline{\underline{4g\ NaCl}}$$

Rx

Boric acid		300mg
Purified water	qs ad	15mL
Dispense		30mL

How many mL of 5% boric acid solution should be used to fill the prescription?

First, let's determine the new concentration of boric acid knowing that there are 300mg (0.3g) in 15mL of solution.

$$\left(\frac{0.3g}{15mL}\right)\times 100\% = 2\%w/v$$

Now we'll label our variables. Remember that we're making 30mL (so basically 2x the prescription).

$C_1 = 5\%\, w/v$ $\qquad$ $Q_1 = ??$

$C_2 = 2\%\, w/v$ $\qquad$ $Q_2 = 30\, mL$

Write out our equation and solve for Q_1.

$$C_1Q_1 = C_2Q_2$$

$$Q_1 = \frac{C_2Q_2}{C_1} = \frac{\left(2g/100mL\right)\times\left(30mL\right)}{\left(5g/100mL\right)} = \underline{\underline{12mL}}$$

What is the ratio strength of triturate made by mixing 200mg (0.2g) of a drug in 3g or triturate?

$$\frac{0.2g\ drug}{3g\ triturate} = 6.67\%w/v$$

But we're asked for the ratio strength = 1/z. So we just take the inverse of the percent.

$$z = \frac{1}{6.67\%} = \frac{1}{0.0667} = 15$$

$$1/z = \underline{\underline{1/15\ w/w}}$$

How many grams of a 1:30 trituration would you need to obtain 50mg drug?

Remember that ratios are given in g/mL not mg so we need to convert the mg to g first.

$$\underline{50mg\ drug}\times\left(\frac{1g}{1000mg}\right)\times\left(\frac{30g\ trituration}{1g\ drug}\right) = \underline{\underline{1.5g\ trituration}}$$

How many mg of a 1:40 dilution of drug A should be used by a compounding pharmacist in preparing 200 capsules each containing 1mg of drug?

Remember to convert to grams.

$$\underline{200\ capsules}\times\left(\frac{1mg\ drug}{1\ capsule}\right)\times\left(\frac{1g}{1000mg}\right)\times\left(\frac{40g\ triturate}{1g\ drug}\right) = \underline{\underline{8g\ triturate}}$$

If one tablespoonful of Povidone iodine solution (10%) is diluted to 1L with water, what is the ratio strength of the dilution?

$C_1 = 10\%w/v$ $\quad$ $Q_1 = 1tbsp = 15mL$

$C_2 = ??$ $\quad$ $Q_2 = 1L = 1000mL$

Rearrange equation and solve for C_2.

$$C_1Q_1 = C_2Q_2$$

$$C_2 = \frac{C_1Q_1}{Q_2} = \frac{\left(10g/100mL\right)\times\left(15mL\right)}{1000mL} = 3g/2000mL \div 3 = 1g/667mL = \underline{\underline{1/667\ w/v}}$$

How many mL of water must be added to 250mL of 25% w/v stock solution of NaCl to prepare 0.9% w/v solution?

$C_1 = 25\%w/v$ $\quad$ $Q_1 = 250mL$

$C_2 = 0.9\%w/v$ $\quad$ $Q_2 = ??$

Rearrange equation and solve for Q_2.

$$C_1Q_1 = C_2Q_2$$

$$Q_2 = \frac{C_1Q_1}{C_2} = \frac{\left(25g/100mL\right)\times\left(250mL\right)}{\left(0.9g/100mL\right)} = 6944mL$$

But remember we're solving for how much needs to be added to our original 250mL.

$$6944mL - 250mL = \underline{\underline{6694mL}}$$

What does the concentration of a benzalkonium chloride solution need to be if 10mL diluted to 1L equals a 1:5000 w/v solution?

Label our variables.

$C_1 = ??$ $\quad Q_1 = 10mL$

$C_2 = 1g/5000mL$ $\quad Q_2 = 1L = 1000mL$

Rearrange equation and solve for C_1.

$$C_1Q_1 = C_2Q_2$$

$$C_1 = \frac{C_2Q_2}{Q_1} = \frac{\left(1g/5000mL\right)\times\left(1000mL\right)}{10mL} = \underline{\underline{1g/50mL \text{ or } 2\%w/v}}$$

How many mL of a 17% solution of benzalkonium chloride should be used in preparing a 240mL prescription at this concentration?

Label our variables.

$C_1 = 17\%w/v$ $\quad Q_1 = ??$

$C_2 = 2\%w/v$ $\quad Q_2 = 240mL$

Rearrange equation and solve for Q_1.

$$C_1Q_1 = C_2Q_2$$

$$Q_1 = \frac{C_2Q_2}{C_1} = \frac{\left(2g/100mL\right)\times\left(240mL\right)}{\left(17g/100mL\right)} = \underline{\underline{28.2mL}}$$

The usual dose of a drug is 33mg/kg/day divided into three equal doses. How many mL of 30%w/v solution of the drug should be added to a 100mL bag of normal saline administered to a patient weighting 110lb to provide one dose?

Determine the patient's mass in kg.

$$\frac{110lb}{}\times\left(\frac{1kg}{2.2lb}\right) = 50kg$$

Determine the appropriate dose for a person whose mass is 50kg.

$$\frac{50kg}{}\times\left(\frac{33mg}{kg\cdot day}\right)\times\left(\frac{1day}{3doses}\right)=550\,\tfrac{mg}{dose}=0.55\,\tfrac{g}{dose}$$

This dose is going to be administered via a 30% 100mL IV bag. 30% = 30g of drug per 100mL of solution. So we want to find how many mL of this solution 0.55g is equivalent to.

$$\frac{0.55g}{dose}\times\left(\frac{100mL}{30g}\right)=\underline{\underline{1.8\,\tfrac{mL}{dose}}}$$

Rx

Hydrocortisone
Hexachlorophene aa 0.25%
Coal tar solution 1:25 w/v 10mL
Hydrophilic ointment ad 120g

M. Ft 200g

How many 20mg tablets of hydrocortisone would you need?

Let's figure out how many grams of hydrocortisone we need:

$$\frac{200g\ mixture}{}\times\left(\frac{0.25g\ hydrocorticone}{100g\ mixture}\right)=0.5g\ hydrocortisone$$

And each tab has a mass of 20mg (0.02g):

$$\frac{0.5g\ hydrocortisone}{}\times\left(\frac{1\,tablet}{0.02g\ hydrocortisone}\right)=\underline{\underline{25\,tablets}}$$

How many mL of 20% w/v coal tar solution would you need?

Determine how much coal tar solution we need.

$$\frac{200g\ mixture}{}\times\left(\frac{10mL\ coal\ tar\ solution}{120g\ mixture}\right)=16.67mL\ coal\ tar\ solution$$

But we're using a 20% w/v solution not the 1:25 solution. So label the variables:

$$C_1=\tfrac{1g}{25mL}\qquad Q_1=16.67mL$$
$$C_2=20\%w/v\qquad Q_2=??$$

Rearrange our equation and solve for Q_2.

$$C_1Q_1=C_2Q_2$$
$$Q_2=\frac{C_1Q_1}{C_2}=\frac{\left(\tfrac{1g}{25mL}\right)\times(16.67mL)}{\left(\tfrac{20g}{100mL}\right)}=\underline{\underline{3.3mL}}$$