Chapter 9

Basic Medication Calculations

A student enters a pharmacy and asks, "Do you have a pill for math?" The pharmacist says "Wait just a moment", and goes back into the storeroom and brings back a whopper of a pill and plunks it on the counter. "I have to take that huge pill for math?" inquires the student. The pharmacist replies "Well, you know math always was a little hard to swallow."

--Unknown Author

This chapter is intended to provide an overview of some basic concepts involved in pharmacy math including:

- calculating dosages when giving medications in tablet or capsule form,
- calculating dosages when giving medications in liquid form, and
- percentage strength of solutions.

An important thing to keep in mind while doing this chapter is that many of the concepts taught in this section will still be applied in the coming weeks.

Calculating Dosages When Giving Medications in Tablet or Capsule Form

On a regular basis, you will need to figure out how many tablets or capsules to dispense. These problems are usually made easier with the “5 Step Method” and dimensional analysis. Key things to look for are the quantity of medication per dose, the strength of the tablet, how often the doses are being given and how long of a time frame we need to cover with these doses. You may need to include some conversion factors.

Without wanting to over explain the process, let's look at an example problem on the next page where we just want to find a number of tablets needed per dose.

Example

A 100 mg dose of medication is ordered, and the tablet size available is 25 mg. How many tablets will be needed per dose?

QUESTION

How many tablets will be needed per dose?

DATA

$\frac{100\ mg}{dose}$ $\frac{25\ mg}{tablet}$

METHOD/FORMULA

dimensional analysis

DO THE MATH

$$\frac{100\ mg}{dose} \times \frac{tablet}{25\ mg} = \mathbf{4\ tablets/dose}$$

DOES THE ANSWER MAKE SENSE?

Yes

Some important items to point out are that you need to be able to interpret the data in the word problem to pick out the necessary information. An example would be that when the problem says “A 100 mg dose of medication is ordered.....” the ability to express it mathematically as 100 mg/dose. Another thing to point out is that when you are using dimensional analysis you need to line up your units the correct way. In the above problem, we need tablets on top and dose on the bottom, which was why we needed to 'flip' 25 mg/tablet so that tablet was on top.

Using what we've just discussed, let's attempt another practice problem.

Practice Problem

The ordered medication is gr xxx/dose. The available capsules are gr v. How many capsules are needed per dose?

QUESTION

DATA

MATHEMATICAL METHOD / FORMULA

DO THE MATH

DOES THE ANSWER MAKE SENSE?

6 capsules/dose

Provided that the practice problem on the previous page made sense, let's do a few more practice problems before we expand on this idea.

Practice Problems

Calculate the number of capsules or tablets needed per dose.

1) 300 mg ordered; 50 mg/capsule available

2) gr xvi ordered; gr iv/tab available

3) gr ii ordered; gr ss/tab available

4) 250 mg ordered; 125 mg/cap available

5) gr v ordered; 100 mg/cap available

1) 6 capsules/dose 2) 4 tablets/dose 3) 4 tablets/dose 4) 2 capsules/dose 5) 3 capsules/dose

Besides just figuring out how many tablets or capsules we will need for a particular dose, we will need to look at how many we need to cover a particular time frame in order for us to provide a sufficient quantity for the patient. Most institutional settings provide medications in 24 hour increments, although this may vary between various institutions.

Example

If gr v t.i.d. is ordered and 100 mg capsules are available, then what is the total number of capsules needed per day?

QUESTION

What is the total number of capsules needed per day?

DATA

$\frac{5\ gr}{dose}$ $\frac{3\ doses}{day}$ $\frac{100\ mg}{cap}$

And you will need a conversion factor for grains to milligrams, which is either:

$\frac{60\ mg}{gr}$ *or* $\frac{65\ mg}{gr}$

MATHEMATICAL METHOD / FORMULA

dimensional analysis

DO THE MATH

$$\frac{5\ gr}{dose} \times \frac{3\ doses}{day} \times \frac{60\ mg}{gr} \times \frac{cap}{100\ mg} = \mathbf{9\ capsules/\ day}$$

DOES THE ANSWER MAKE SENSE

Yes

In the above scenario you needed to use 60 mg/gr, if you had used 65 mg/gr you would have ended up with 9.75 capsules. While tablets can be cut in half (and sometimes in quarters) capsules can only be given in whole numbers; therefore 60 mg/gr works out much better in this problem.

Now, using what we've just discussed let's attempt a practice problem on the next page using the “5 Step Method”.

Practice Problems

A physician orders 90 mg q.4h. of a medication; and you have gr ss/cap in stock on this medication. What is the total number of capsules needed per day?

QUESTION

DATA

MATHEMATICAL METHOD / FORMULA

DO THE MATH

DOES THE ANSWER MAKE SENSE?

18 capsules/day

Provided that the above practice problem made sense, let's do a few more practice problems

Practice Problems

Calculate the number of capsules or tablets needed per day.

1) 0.4 g q.2h ordered; 200 mg/tab available

2) 60 mg b.i.d. ordered; gr ss/cap available

3) 150 gr q.h. ordered; ʒ v/tab available

4) gr ss t.i.d. ordered; 65 mg/tab available

5) 600 mg q.8h. ordered; 50 mg/tab available

Worksheet 9-1

Name:

Date:

Calculate the number of capsules or tablets needed for the following doses.

1) If 200 mg/dose of a medication is ordered and it is available as 50 mg/cap, how many caps are needed per dose?

2) If gr iv/dose of a medication is ordered and it is available as gr ss/tab, how many tabs are needed per dose?

3) If 150 mg/dose of a medication is ordered and it is available as 25 mg/tab, how many tabs are needed per dose?

4) If gr viii/dose of a medication is ordered and it is available as gr ii/cap, how many caps are needed per dose?

5) If 75 mg/dose of a medication is ordered and it is available as 150 mg/tab, how many tabs are needed per dose?

6) If 500 mg/dose of a medication is ordered and it is available as 125 mg/cap, how many caps are needed per dose?

7) If 400 mg/dose of a medication is ordered and it is available as 0.1 g/tab, how many tabs are needed per dose?

8) If 300 gr/dose of a medication is ordered and it is available as ℥ i/tab, how many tabs are needed per dose?

9) If 0.2 g/dose of a medication is ordered and it is available as 100 mg/tab, how many tabs are needed per dose?

10) If gr ii/dose of a medication is ordered and it is available as 60 mg/tab, how many tabs are needed per dose?

Calculate the number of capsules or tablets needed over 24 hours.

11) If 50 mg/dose of a medication is ordered t.i.d. and it is available as 25 mg/tab, how many tabs are needed per day?

12) If gr xx/dose of a medication is ordered q.4h. and it is available as gr v/tab, how many tabs are needed per day?

13) If 10 mg/dose of a medication is ordered q.4h. and it is available as 5 mg/tab, how many tabs are needed per day?

14) If 100 mg/dose of a medication is ordered b.i.d. and it is available as 25 mg/cap, how many caps are needed per day?

15) If gr xvi/dose of a medication is ordered q.3h. and it is available as gr viii/cap, how many caps are needed per day?

16) If 10 mg/dose of a medication is ordered q.h. and it is available as 5 mg/tab, how many tabs are needed per day?

17) If 0.2 g/dose of a medication is ordered q.4h. and it is available as 100 mg/tab, how many tabs are needed per day?

18) If gr ss/dose of a medication is ordered b.i.d. and it is available as 60 mg/tab, how many tabs are needed per day?

19) If 100 mg/dose of a medication is ordered b.i.d. and it is available as 0.1 g/tab, how many tabs are needed per day?

20) If gr ii/dose of a medication is ordered q.8h. and it is available as 60 mg/tab, how many tabs are needed per day?

Calculate the number of capsules or tablets needed to fill the following prescriptions.

21) Rx Ambien 5 mg/tab
Disp: 14 day supply
Sig: 1 tab po hs

22) Rx furosemide 20 mg/tab
Disp: 7 day supply
Sig: 1 tab po bid

23) Rx alprazolam 0.5 mg/tab
Disp: 7 day supply
Sig: 1 tab po tid

24) Rx Lopressor 25 mg/tab
Disp: 30 day supply
Sig: 12.5 mg po bid

25) Rx zafirlukast 20 mg/tab
Disp: 7 day supply
Sig: 1 tab bid

26) Rx tetracycline 250 mg/cap
Disp: 3 day supply
Sig: 1 cap qid

27) Rx repaglinide 0.5 mg/tab
Disp: 21 day supply
Sig: 1 tab po tid

28) Rx dipyridamole 50 mg
Disp: 21 day supply
Sig: 1 tab po qid

29) Rx zidovudine 100 mg/cap
Disp: 90 day supply
Sig: 300 mg po q12h

Calculating Dosages When Giving Medications in Liquid Form

Frequently you will need to transfer solutions from manufacturers' containers, to patient specific containers, which will contain just enough solution for the patient's needs. These problems are usually made easier with the “5 Step Method” and dimensional analysis or ratio proportions. Key things to look for are the quantity of medication per dose, the concentration of the liquid, how often the doses are being given and how long of a time-frame we need to cover with these doses. Just like in the previous section, you may need to include some conversion factors.

Without wanting to over explain the process, let's look at an example problem where we just want to find out how many mL need to be withdrawn from a vial.

Example

An order for 50 mg of a drug is received. A 10 mL vial with 100 mg/mL is available. How many mL should be withdrawn from the vial?

QUESTION

How many mL should be withdrawn from the vial?

DATA

$$\frac{50\ mg}{dose} \quad \frac{10\ mL}{vial} \quad \frac{100\ mg}{mL}$$

MATHEMATICAL METHOD / FORMULA

Dimensional Analysis or Ratio Proportion

DO THE MATH

dimensional analysis

$$\frac{50\ mg}{dose} \times \frac{mL}{100\ mg} = \mathbf{0.5\ mL/dose}$$

ratio proportion

$$\frac{50\ mg}{N} = \frac{100\ mg}{mL}$$

$$N = \mathbf{0.5\ mL}$$

DOES THE ANSWER MAKE SENSE?

Yes

Two things worth noting are the fact that you had more information than was needed to solve the problem (the 10 mL vial was not necessary information to do the math) and that you could have solved this with either dimensional analysis or ratio proportion. Using the above problem as a template, let's attempt the practice problem on the next page using the “5 Step Method”.

Practice Problem

A physician orders azithromycin 500 mg IV. In the pharmacy you have 250 mg/5 mL in stock. Calculate the number of mL required to fill this order.

QUESTION

DATA

MATHEMATICAL METHOD / FORMULA

DO THE MATH

DOES THE ANSWER MAKE SENSE?

10 mL

Provided that the above practice problem made sense, let's do a few more practice problems before we expand on this idea.

Practice Problems

Assume that all of the solutions below are in 10 mL vials. Calculate the amount of solution to be withdrawn from the vial.

1) 20 mg is ordered; 50 mg/mL is available.

2) 60 mg is ordered; 40 mg/mL is available.

3) 80 mg is ordered; 50 mg/mL is available.

4) 40 mg is ordered; 50 mg/mL is available.

5) 75 mg of drug ordered; 100 mg/cc available

1) 0.4 mL 2) 1.5 mL 3) 1.6 mL 4) 0.8 mL 5) 0.75 cc

Sometimes drugs are ordered in units. A unit is a measurement for the amount of a substance, based on measured biological activity or effect. The unit is used for vitamins, hormones, some medications, vaccines, blood products, and similar biologically active substances. Calculating a dosage in units is no different than what we have already been doing with other labels (mg, gr, etc.). Let's take a moment and look at an example problem using units.

Example

8,000 units of a drug is ordered. A 10 cc vial containing 10,000 units/cc is available. How many cc should be withdrawn from the vial?

QUESTION

How many cc should be withdrawn from the vial?

DATA

$$\frac{8{,}000\ units}{dose} \qquad \frac{10\ cc}{vial} \qquad \frac{10{,}000\ units}{cc}$$

MATHEMATICAL METHOD / FORMULA

Dimensional Analysis or Ratio Proportion

DO THE MATH

$$\underset{dimensional\ analysis}{\frac{8{,}000\ units}{dose} \times \frac{cc}{10{,}000\ units} = \mathbf{0.8\ cc/dose}} \qquad \underset{ratio\ proportion}{\frac{8{,}000\ units}{N} = \frac{10{,}000\ units}{cc}}$$

$$N = \mathbf{0.8\ cc}$$

DOES THE ANSWER MAKE SENSE?

Yes

Just like the previous problems, the above problem was able to be solved two different ways. Using the above problem as a template, let's attempt a few practice problems below.

Practice Problems

Assume that all of the solutions below are in 10 mL vials. Calculate the amount of solution to be withdrawn from the vial.

1) 6000 units ordered; 5000 units/cc is available.

2) 300,000 units ordered; 200,000 units/mL is available.

3) 500,000 units ordered; 1,000,000 units/mL is available.

1) 1.2 cc 2) 1.5 mL 3) 0.5 mL

Sometimes medications will come as a lyophylized powder to provide longer stability and/or easier shipping and they need to be reconstituted prior to patient use. Let's look at an example problem to demonstrate this concept.

Example

300,000 units is to be administered from a vial containing 1,000,000 units reconstituted with 5 cc of diluent. The reconstituted vial contains 200,000 units/cc. How many cc should be withdrawn from the reconstituted vial?

QUESTION

How many cc should be withdrawn from the reconstituted vial?

DATA

$$\frac{300{,}000\ units}{dose} \quad \frac{200{,}000\ units}{cc} \quad \frac{1{,}000{,}000\ units}{vial} \quad reconstituted\ with\ 5\ cc$$

MATHEMATICAL METHOD / FORMULA

Dimensional Analysis or Ratio Proportion

DO THE MATH

$$\underset{dimensional\ analysis}{\frac{300{,}000\ units}{dose} \times \frac{cc}{200{,}000\ units} = \mathbf{1.5\ cc/dose}} \qquad \underset{ratio\ proportion}{\frac{300{,}000\ units}{N} = \frac{200{,}000\ units}{cc}}$$

$$N = \mathbf{1.5\ cc}$$

DOES THE ANSWER MAKE SENSE?

Yes

Once again, you had unnecessary information and multiple ways to choose to solve these problems. Using the above problem as a template, let's attempt a couple of practice problems below.

Practice Problems

1) 200,000 units is to be administered from a vial containing 500,000 units reconstituted with 5 cc of diluent. The reconstituted vial now contains 100,000 units/cc. How many cc should be withdrawn from the reconstituted vial?

2) 750 mg of methylprednisolone injection is ordered. A vial containing 1000 mg is reconstituted with 7.4 mL of sterile water for injection and has 0.6 ml of powder volume. The final concentration in the vial is 125 mg/mL. How many mL should be withdrawn from the reconstituted vial?

1) 2 cc 2) 6 mL

Worksheet 9-2

Name:

Date:

Calculate the quantity of volume that needs to be withdrawn from the following vials to fill their orders.

1) 75 mg of drug ordered; a 10 cc vial with a concentration of 100 mg/cc is available.

2) 40 mg of drug ordered; a 10 cc vial with a concentration of 100 mg/cc is available.

3) 50 mg of drug ordered; a 10 cc vial with a concentration of 100 mg/cc is available.

4) 20 mg of drug ordered; a 10 cc vial with a concentration of 50 mg/cc is available.

5) 60 mg of drug ordered; a 10 cc vial with a concentration of 40 mg/cc is available.

6) 80 mg of drug ordered; a 10 cc vial with a concentration of 50 mg/cc is available.

7) 40 mg of drug ordered; a 10 cc vial with a concentration of 50 mg/cc is available.

8) A physician orders 37.5 mg of methotrexate, and the 2 mL stock vial in the pharmacy has a concentration of 25 mg/mL. How many mL will you need to dispense to provide the appropriate dose?

9) A physician orders 1050 mg of fluorouracil, and the stock vial in the pharmacy has a concentration of 50 mg/mL. How many mL will you need to dispense to provide the appropriate dose?

10) A physician orders 62.5 mg of methotrexate, and the 25 mL stock vials in the pharmacy have a concentration of 2 mg/mL. How many mL will you need to dispense to provide the appropriate dose?

11) 6,000 units of drug ordered; a 10 cc vial with a concentration of 5,000 units/cc is available.

12) 300,000 units of drug ordered; a 10 cc vial with a concentration of 200,000 units/cc is available.

13) 500,000 units of drug ordered; a 10 cc vial with a concentration of 1,000,000 units/cc is available.

14) A TPN requires the addition of 15 units of regular insulin. A 10 mL vial with a concentration of 100 units/mL is available. How many mL of insulin should be added to the TPN?

15) You receive an order for heparin 12,000 units to be added to an IV bag. If the concentration of the heparin available is 5,000 units/mL, how many mL of heparin should you use?

16) 200,000 units are ordered ; a vial containing 1,000,000 units is reconstituted with 10 cc of diluent. The reconstituted solution now contains 100,000 units/cc.

17) 300,000 units are ordered ; a vial containing 2,000,000 units is reconstituted with 10 cc of diluent. The reconstituted solution now contains 200,000 units/cc.

18) 50,000 units are ordered ; a vial containing 1,000,000 units is reconstituted with 10 cc of diluent. The reconstituted solution now contains 100,000 units/cc.

19) 150,000 units are ordered ; a vial containing 2,000,000 units is reconstituted with 10 cc of diluent. The reconstituted solution now contains 200,000 units/cc.

20) An order is written for 4,000,000 units of penicillin G potassium. You have a vial containing 20,000,000 units. The directions are to add 32 mL of sterile water for injection to reconstitute to a concentration of 500,000 units/mL (the vial contains 8 mL of powder volume). How many mL of the reconstituted solution will you need to dispense?

Percentage Strength Solutions

There are many ways to express the concentration of a drug, one of the most common is percentage strength (*hint: remember that "percent" means "per 100"*) .

There are three kinds of percentage strength that you will frequently use when doing dosage calculations:

> **weight/weight** (w/w) – examples include ointments, creams, etc.
> **volume/volume** (v/v) – a common example is an alcohol preparation
> **weight/volume** (w/v) – this is the most common group and includes items such as solutions, suspensions, etc.

Weight/Weight (w/w)

A weight/weight percentage strength expresses the number of parts in 100 parts of a preparation . Typically it is expressed as number of grams per 100 grams, but it could be expressed in any unit of weight (grams, grains, ounces, pounds, etc.) as long as the units on the top and bottom match. Let's look at an example to help this make more sense.

Example

What would be the weight, expressed in grams, of zinc oxide (zinc oxide is the active ingredient) in 120 grams of a 10% zinc oxide ointment (the ointment is the total mixture)?

QUESTION

How many grams of zinc oxide are in the ointment?

DATA

$120\ g\ of\ ointment \qquad 10\% = \frac{10\ g\ zinc\ oxide}{100\ g\ ointment}$

MATHEMATICAL METHOD / FORMULA

Ratio Proportion (This can be done other ways, but this is the easiest method to explain thoroughly.)

DO THE MATH

$$\frac{N}{120\ g\ ointment} = \frac{10\ g\ zinc\ oxide}{100\ g\ ointment}$$

$$N = \mathbf{12\ g\ zinc\ oxide}$$

DOES THE ANSWER MAKE SENSE?

Yes

Let's look at a couple of practice problems based on w/w percentage strength.

Practice Problem 1

What would be the percentage strength of a zinc oxide ointment if you prepared 90 grams of an ointment that contained 5 grams of zinc oxide? *(Hint: In this problem you have the weight of the active ingredient and the weight of the mixture, you need to find the percentage strength which would be out of 100 grams of mixture)*

QUESTION

DATA

MATHEMATICAL METHOD / FORMULA

DO THE MATH

DOES THE ANSWER MAKE SENSE?

5.6% zinc oxide ointment

Now, let's look at another w/w practice problem.

Practice Problem 2

If you were to prepare 150 g of a coal tar ointment containing 12 g of coal tar, what is the percent strength of coal tar in the ointment?

QUESTION

DATA

MATHEMATICAL METHOD / FORMULA

DO THE MATH

DOES THE ANSWER MAKE SENSE?

8% coal tar ointment

Volume/Volume (v/v)

Volume/volume percentage strength problems are worked out in a similar manner to w/w percentage strength problems, except now the ingredients are liquids. Typically it is expressed as number of milliliters per 100 milliliters, but it could be expressed in any unit of volume (liters, pints, fluid ounces, etc.) as long as the units on the top and bottom match. Look at the example problem below, and then complete the practice problem.

Example

How mL of isopropyl alcohol are in a 480 ml bottle of 70% isopropyl alcohol?

QUESTION

How many mL of isopropyl alcohol are in the bottle?

DATA

$480\ mL\ of\ mixture \qquad 70\%\ isopropyl\ alcohol = \frac{70\ mL\ isopropyl\ alcohol}{100\ mL\ mixture}$

MATHEMATICAL METHOD / FORMULA

Ratio Proportion (This can be done other ways, but this is the easiest method to explain thoroughly.)

DO THE MATH

$$\frac{N}{480\ mL\ mixture} = \frac{70\ mL\ isopropyl\ alcohol}{100\ mL\ mixture}$$

$$N = \mathbf{336\ mL\ isopropyl\ alcohol}$$

DOES THE ANSWER MAKE SENSE?

Yes

Practice Problem

How many mL of lysol would be required to make 4000 mL of a 2% lysol solution?

QUESTION

DATA

MATHEMATICAL METHOD / FORMULA

DO THE MATH

DOES THE ANSWER MAKE SENSE?

80 mL of lysol

Weight/Volume (w/v)

Weight/volume (w/v) percentage strengths are the most common percentages worked with in pharmacy. The units in this type of problem are **always** grams of drug dissolved in 100 milliliters of solution. Let's look at a practice problem.

Example

How many grams of sodium chloride are in a 500 mL bag of 0.9% sodium chloride?

QUESTION

How many g of sodium chloride are in the bag?

DATA

500 *mL of mixture* $\qquad 0.9\%\ sodium\ chloride = \frac{0.9\ g\ sodium\ chloride}{100\ mL\ mixture}$

MATHEMATICAL METHOD / FORMULA

Ratio Proportion

DO THE MATH

$$\frac{N}{500\ mL\ mixture} = \frac{0.9\ g\ sodium\ chloride}{100\ mL\ mixture}$$

$$N = \mathbf{4.5\ g\ sodium\ chloride}$$

DOES THE ANSWER MAKE SENSE?

Yes

As w/v percentage strength problems are the ones we will be working with most frequently (and what we are going to concentrate on in this chapter) it is worth pointing out that our ratio proportions for w/v percentage strength problems always have grams on top and milliliters on the bottom. Let's look at a practice problem.

Practice Problem

How many grams of neomycin are needed to prepare 500 mL of a 1% neomycin solution?

QUESTION

DATA

MATHEMATICAL METHOD / FORMULA

DO THE MATH

DOES THE ANSWER MAKE SENSE?

5 g of neomycin

Let's look at some additional practice problems.

Practice Problems

1) You dissolve 10 g of mannitol in 50 mL of water. What is the percentage of mannitol?

2) How much solution can you make from 25 g of drug, if you want a 10% concentration?

3) How much drug is in 50 cc of a 1% solution?

4) How many cc of a 20% solution can be made with 5 g of drug?

1) 20% 2) 250 mL 3) 0.5 g 4) 25 cc

Worksheet 9-3

Name:

Date:

Make the calculations needed to prepare these solutions.

1) What weight of drug is in 10 cc of a 15% solution?

2) A 100 mL solution contains 10 g of a drug. What is the percent concentration of this solution?

3) How many cc of a 30% solution can be made with 15 g of drug?

4) What weight of drug is in 15 mL of a 10% solution?

5) A 200 cc solution contains 20 g of a drug. What is the percent concentration of this solution?

6) How many cc of a 10% solution can be made with 15 g of a drug?

7) What weight of drug is in 20 mL of an 8% solution?

8) What weight of drug is in 50 cc of a 1% solution?

9) A 200 cc solution contains 40 g of a drug. What is the percent concentration of this solution?

10) A 300 mL solution contains 3 g of a drug. What is the percent concentration of this solution?

11) How many cc of a 5% solution can be made with 10 g of a drug?

12) How many mL of a 2% solution can be made with 6 g of a drug?

13) How many cc of a 10% solution can be made with 5 g of drug?

14) What weight of drug is in 30 mL of a 15% solution?

15) A solution of 80 cc contains 50 g of a drug. What is the percent concentration of this solution?

Worksheet 9-4

Name:

Date:

Solve the following practical percentage strength problems. *Hint: All the problems on this worksheet are w/v percentage strength problems.*

1) You have a patient with severe renal impairment and the physician wants him to receive a TPN with 10 g of amino acid. How many mL of a 5.2% amino acid (Aminosyn-RF) solution will you need to add to the TPN?

2) You have an order for 1 g of calcium gluconate IV. It is available in a 10 mL vial with a 10% concentration. How many mL will you need to draw up?

3) You have a 10 mL vial of 50% magnesium sulfate, and you receive an order for 4 g of magnesium sulfate IV. How many mL will you need to draw up?

4) You receive an order for 2500 mg of magnesium sulfate IV. How many mL would you withdraw from a 10 mL vial of 50% magnesium sulfate.

5) A CRNA intern needs to administer 100 mg of procaine. The vial he has on his block cart in the OR has a concentration of 1%. How many mL should you tell him to administer?

6) You added 15.4 mL of a 14.6% sodium chloride solution to a 1000 mL bag of sterile water for injection. How many grams of sodium chloride are in the final bag?

7) A patient on an ICU unit was suffering from calcium channel blocker toxicity so a physician had a nurse give 10 cc of 10% calcium chloride injection stat. The nurse is asking you how many grams of calcium chloride she should chart as having given the patient.

8) A nurse hung a 500 mL IV bag with 20% mannitol, but only wants to infuse 50 g. How many mL should you tell her to infuse?

Worksheet 9-5

Name:

Date:

Calculate the number of capsules or tablets needed per dose.

1) 150 mg of drug ordered; 75 mg/tab available

2) 0.3 g/dose ordered; 100 mg/tab available

3) 240 gr/dose ordered; ℥ iv/tab available

4) 150 mg of drug ordered; 100 mg/tab available

5) 0.2 g/dose ordered; 200 mg/cap available

Calculate the total number of capsules or tablets needed over 24 hours.

6) If 0.4 g/dose of a medication is ordered q.i.d. and it is available as 200 mg/tab, how many tabs are needed per day?

7) If 120 mg/dose of a medication is ordered b.i.d. and it is available as gr iv/tab, how many tabs are needed per day?

8) If 0.1 g/dose of a medication is ordered q.6h. and it is available as 50 mg/cap, how many caps are needed per day?

9) If gr iiss/dose of a medication is ordered t.i.d. and it is available as gr ss/tab, how many tabs are needed per day?

10) If 240 mg/dose of a medication is ordered h.s. and it is available as gr ii/cap, how many caps are needed per day?

Calculate the amount of solution to be withdrawn from a 10 cc vial.

11) 60 mg of drug ordered; 100 mg/cc available

12) 40 mg of drug ordered; 100 mg/cc available

13) 60 mg of drug ordered; 40 mg/cc available

14) 80,000 units are ordered. A vial containing 1,000,000 is reconstituted with 10 cc of diluent. The reconstituted solution now contains 100,000 units/cc.

15) 50,000 units are ordered. A vial containing 200,000 is reconstituted with 10 cc of diluent. The reconstituted solution now contains 20,000 units/cc.

Solve the following (*w/v*) percent strength problems.

16) What weight of drug is in 10 mL of a 8% solution?

17) A 500 cc solution contains 15 g of a drug. What is the percent concentration of this solution?

18) How many mL of a 20% solution can be made with 18 g of drug?

19) What weight of drug is in 5 mL of a 10% solution?

20) A 150 mL solution contains 15 g of a drug. What is the percent concentration of this solution?