Developmental Mathematics Made Simple For The Medical Field Undergraduate

Owens Community College
Health Professions Pathways (H2P) Grant

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Table of Contents

Chapter 1: Whole Numbers

Base Ten Number System and Place Value

We use what is called the base-ten or decimal system. Mathematicians believe we have a base ten decimal system because we have ten fingers and our ancestors used their fingers to count objects.

We only use the digits from zero through 9 to express value in our number system. Once we get to the number 10 then we start over again from 0 to nine and add a digit creating another column of numbers or another place value position. We do the same for each place value column.

Because of this perpetual cycle of counting and adding digits, each place value column is ten times bigger than the place value column or digits before it.

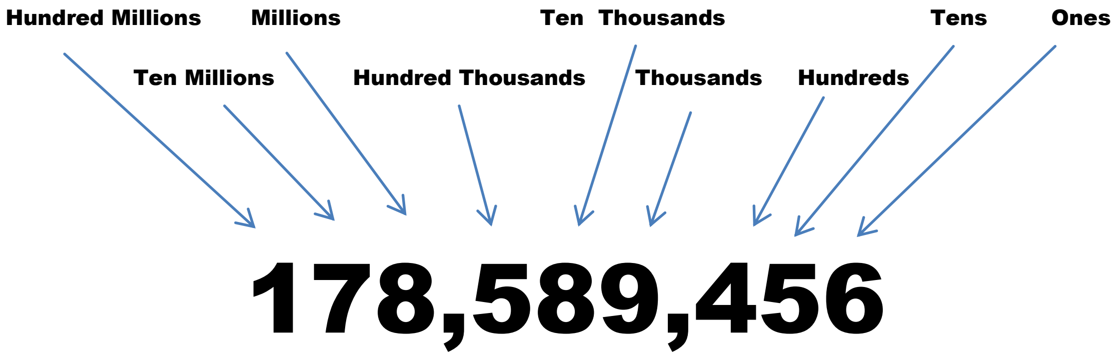
We do not typically state the zero in front of each digit in the ones place value column, for the sake of this demonstration; I will put the zeros in front of the digits.

00 01 02 03 04 05 06 07 08 09
10 11 12 13 14 15 16 17 18 19
20 21 22 23 24 25 26 27 28 29
30 31 and so forth

Once we get to 99, we must then add another column or place value

90 91 92 93 94 95 96 97 98 99
100 101 and so forth……..

The columns or place value positions are named



Write the place value position of the underlined digit

Example: 789,962 Thousands

1. 58,635,459 ______________
2. 75,925 ______________
3. 39,448 ______________
4. 3,148,554 ______________
5. 42,694 ______________
6. 796,215,521 ______________
7. 25,854,893 ______________
8. 39,447,582 ______________
9. 1,559,849 ______________
10. 9,742,894 ______________

Answers on page 67

Write the value of the underlined digit.

Example: 256,689 50,000

11. 58,635,459 ________________

12. 75,925 ________________

13. 39,448 ________________

14. 3,148,554 ________________

15. 42,694 ________________

16. 796,215,521 ________________

17. 25,854,893 ________________

18. 39,447,582 ________________

19. 1,559,849 ________________

20. 9,742,894 ________________

Answers on page 67

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Adding Whole Numbers

The numbers in an addition number sentence is called addends. The total when addends are added together is called the sum.

$$5 + 4 = 9$$

Addend + Addend = Sum

5 and 4 are addends and 9 is the sum

When you add whole numbers or addends, the addends have to line up with the same place value addend column to get a correct sum.

For example, $123 + 45 = ?$

Line up the addends in the same place value position column and then add.

Hundreds Tens Ones

$$\begin{array}{r} 123 \\ \underline{+45} \\ 168 \end{array}$$

You line up the ones in the ones column, and the tens in the tens column and the hundreds in the hundreds column and then you add. In the problem above you do not have to regroup or carry over any numbers to the next place value column or position. Let's look at a problem that you would need to regroup or carry over.

$$\begin{array}{r} {\scriptstyle 11} \\ 654 \\ \underline{+278} \\ 932 \end{array}$$

When you are adding whole numbers, you starting with the ones column, then tens, column and so forth. In the ones column you have 4 + 8 which equals 12. The 2 is in the ones place and 1 is in the tens place. You are to place the 2 below the bar in the ones column and carry the 1 in the tens column; 12 is 1 ten and 2 ones.
Next, you add your tens column. In the tens column you add what you carried over from the ones column which is 1+5+7 which equals 13. Because the 1 the 5 and 7 are in the tens place, you are actually adding 10 + 50 + 70. Your answer is actually 130.

When we are adding whole numbers in standard form you put the number that is in the tens place which is 3, below the bar. You carry over the 1 or 100 to the hundreds place. 3 tens is the same as 30. Now you add the hundreds column which we have a 1 + 6 + 2 = 9 or 900.

Find the sum to the problems.

1) 71 +11	2) 62 +13	3) 85 +14	4) 41 +56	5) 12 +57
6) 32 +43	7) 485 +85	8) 852 +598	9) 248 +255	10) 3218 +459

11)The number of people that visited the hospital where you work 2 years ago was 753,481. Last year 997,381 people visited the hospital. What was the total number of people who visited the hospital for the last two years?

12)Diane washed 8 loads of laundry at the nursing facility. Banta came in and washed 6 loads. Together they washed 4 more loads. How many loads in all did they wash?

13)During a regular work day at the doctor's office, Marine counted 6, 8, 13, and 16 patients that all the doctors were to see in the office that day. After she was done, she subtracted 9 patients who cancelled their appointments. What was the final number of patients the doctors saw that day?

14)While doing inventory, Michael counted 36 bottles of vaccine, Sophia counted 28 bottles of vaccine, and Danielle counted 62. How many bottles of vaccine were there in all?

15)Kaden gave massages to 13 clients, Skylar massaged 4 clients, and Aaron gave 1 massage. How many total massages did they give?

16)It takes Lucy 6 minutes to transfer a patient from the bed to a wheel chair and it also takes her 6 minutes to place the client from the wheel chair to the bed. How long will it take her to place a client from the bed to the wheel chair and then back in the bed again?

Answers on page 67

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Subtracting Whole Numbers

The first value in a subtraction problem is called the minuend. The second value in a subtraction problem or the one you are subtracting is called the subtrahend. The answer in a subtraction problem is called the difference.

$$8 - 2 = 6$$

Minuend – subtrahend = difference

8 is the minuend, 2 is the subtrahend and 6 is the difference.

Subtraction with one digit is easy.

Sometimes, you will run into subtraction problems that are a little more complicated. With subtraction, you will line your place value digits up in the same column just as you would in addition. However, what if the number in the place value column on the top is smaller than the place value position digit on the bottom? How do you subtract? You must borrow from the place value column in front of it.

Let's look at the example below.

$$\begin{array}{r} 62 \\ \underline{-\ 5} \end{array}$$

This problem is really asking

$$\begin{array}{rr} \text{6(tens) and 2(ones)} & \\ \underline{-\qquad\qquad \text{5 (ones)}} & \end{array} \quad \text{or} \quad \begin{array}{r} \text{60 and 2} \\ \underline{-\quad 5} \end{array}$$

In this situation, we cannot take 5 from 2. It's just not enough. For the ones column we need to borrow 10 from the tens column so that we will have enough.

So now we have……

$$\begin{array}{r} \text{5 tens and 12 ones} \\ \underline{-\qquad\qquad \text{5 ones}} \\ \text{5 tens and 7 ones} \end{array}$$

Or

57

If you have a subtraction problem that has more digits in the minuend and subtrahend, you have to continue to borrow from each place value column until you have gotten the difference.

Find the difference to the problems below.

1) 90	2) 26	3) 38	4) 44	5) 32	6) 66
-35	-17	-29	-36	-28	-29
7) 459	8) 889	9) 562	10) 362	11) 4756	12) 2684
-265	-773	-475	-72	-879	-985

13) 589 – 85 = 14) 2458 – 849 = 15) 849 – 89 =

16) Francine has to find out how many patients did not receive their lunch on the second floor. There are 72 patients on the second floor. She finds out that 16 patients did not get their lunch. How many patients did get their lunch?

17) There are 700 patients admitted to the hospital. Each adult admitted costs on average $40 per day and children cost half of the adults admitted. If 400 people at the hospital are adults, how much money is generated that day for the children admitted?

18) Colby had 29 lab coats to give away. He wanted to share the coats with the students in his class. He gave Rachel 7, Desmond 8, and Beverly 11. How many coats did Colby have left?

19) The pharmacy has to stock up on aspirin. A shipment has come in and there are 150 aspirin bottles in a box. You already put 84 bottles away. How many bottles of aspirin do you still have to put away?

20) Brenda is a surgical technician. She needs to prepare a room for surgery. She puts 30 packs of gauze in the room but realizes that there are only 15 packs of gauze required. How many packs of gauze does she need to remove from the room?

Answers on page 67

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Multiplying Whole Numbers

Multiplication is repeated addition.

$$2 + 2 + 2 = 6$$

Let's look at the number sentence below

$$3 \times 2 = 6$$

The number sentence above means the number is 2 added together 3 times to equal 6.

The numbers that you multiply together are called factors. The answer to a multiplication problem is called a multiple or a product.

$$2 \times 3 = 6$$

Factor x factor = multiple or product

2 and 3 are factors of 6. 6 is a multiple of 2 and 3. 6 is a product of 2 and 3. When you start to multiply multiple digits you have to keep track of the order you are multiplying in. Typically, we multiply the ones one the bottom by all the numbers in the top row and then the tens on the bottom column by all the numbers in the top row and so forth.

$$\begin{array}{r} 23 \\ \underline{\times 6} \end{array}$$

You are really multiplying 20 and 3 by 6. Ultimately it does not matter what numbers you multiply first, what matters most is the lining up of your place value columns correctly.

$$20 \times 6 = 120 \text{ and } 3 \times 6 = 18$$

$$\begin{array}{r} 120 \\ \underline{+18} \\ 138 \end{array}$$

Once you multiply the bottom digit by all the top digits, you must then add the answers up to get the product.

$$23 + 23 + 23 + 23 + 23 + 23 = 138$$

What if you had two digits at the bottom instead of one? You must multiply all the numbers on the bottom by all the numbers on the top and then add to get your product. Make sure you line up the place value columns and carry when necessary.

$$\begin{array}{r} 23 \\ \underline{\times 46} \end{array}$$

$$\begin{aligned} 3 \times 6 &= \quad 18 \\ 20 \times 6 &= \quad 120 \\ 40 \times 3 &= \quad 120 \\ 40 \times 20 &= \underline{+\,800} \\ & \quad\ 1058 \end{aligned}$$

There are four ways multiplication can be represented.

1 x 2 or (1)(2) or 1(2) or 1● 2

Find the product for the problems below.

1) $1 \times 3 =$	2) $(3)9 =$	3) $(8)(9) =$	4) $5 \bullet 6 =$
5) $45 \bullet 5 =$	6) $56 \times 2 =$	7) $68\ (22) =$	8) $74 \times 19 =$
9) $459 \times 2 =$	10) $(596)\ (5) =$	11) $369 \times 45 =$	12) $759 \times 36 =$
13) $365 \times 459 =$	14) $589 \bullet 234 =$	15) $102 \times 470 =$	16) $705 \times 578 =$

17. If Sandra can save $35.00 a week, after 6 weeks how much money will Sandra have?

18. You need to cut 15 pieces of string for stitching, each stitch has to be 21 inches long. How many feet of string do you need in order to stitch the patient?

19. Thomas purchased 54 boxes of bandages. Each box contained 25 bandages. How many bandages did Thomas have?

20. Mr. Simmons ordered new chairs for the waiting room. The chairs have to be ordered in sets of fours. If Mr. Simmons ordered 3 sets of chairs, how many chairs did he order?

Answers on page 68

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Dividing Whole Numbers

When you have numbers in a division problem, the number that is being divided is called a dividend. The number that it is being divided by or doing the dividing is called the divisor. The answer to a division problem is called a quotient.

$$10 \div 5 = 2$$

Dividend ÷ divisor = quotient

Division is exactly what it sounds like. Essentially, you are dividing things into groups. The numbers and the placement of the numbers tell you how you will divide that particular set of numbers you have. Division can also be seen as grouping.

The number sentence $10 \div 5 = 2$, says 10 nurses need to get in groups of 5, therefore there are two groups of nurses. When you look at division problems, it may be easier to create a story out of the division problem to help you understand what is being asked.

Division is also signified by a bar and a division box. For example $\frac{24}{8}$ means the same as, $24 \div 8$.

The bar between the numbers 24 and 8 is called a division bar. It means to divide. The division bar is mainly used in fractions. However, the division bar is also used when calculating dosage problems, this is the form of division you will use most often.

The top number is always the dividend and the bottom number is always the divisor.

Find the quotient to the division problems below.

1) $\frac{96 \text{ mcg}}{32 \text{ mcg}}$ 2) $\frac{81 \text{ mL}}{9 \text{ mL}}$ 3) $\frac{54 \text{ gtt}}{2 \text{ gtt}}$ 4) $\frac{25 \text{ kg}}{5 \text{ kg}}$

5) $\frac{250 \text{ mg}}{50 \text{ mg}}$ 6) $\frac{1000 \text{ cc}}{25 \text{ cc}}$ 7) $\frac{125 \text{ mcg}}{10 \text{ mcg}}$ 8) $\frac{600 \text{ L}}{12 \text{ L}}$

9) Ambulance drivers typically drive 853 miles and use a total of 50 gallons of gasoline in a month. What is the average miles driven per gallon of gasoline?

10) You have 40 nursing assistants that work for you. You need 8 groups to serve various clients based on need. How many nursing assistants will you leave out if you group them by 8?

11) If there are 20 mothers in birthing areas. And 5 babies can be delivered per birthing area. What is the minimum number of birthing areas needed?

12) You need to solve 15 dosage problems to pass a test on Tuesday. If you have 30 minutes to take the test, how many minutes can you spend on each question?

Answers on page 68

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Order of Operation

There is an order of operations. Addition, subtraction, multiplication and division are all considered operations. When you have an equation that has multiple operations, you have to figure out which operation to perform first. This is why we have what's called an order of operation.

A commonly used saying is "Please Excuse My Dear Aunt Sally". This is a technique for remembering the order of operations. "Please Excuse My Dear Aunt Sally" is abbreviated "PEMDAS". It helps you to remember to do certain operations first before others. The "P" stands for Parentheses. The "E" represents exponents. The "M" is Multiplication. The "D" is Division, and "A" is Addition and "S" is Subtraction.

You do the operations in that ranking order.

1) If you have parenthesis in your problem, that is what you calculate first. You always calculate what is in parenthesis first even if it is an addition or a subtraction problem.

2) Next, you look for any exponents and you calculate those.

3) Next, multiplication and division have the same ranking so you actually calculate multiplication and division from left to right. It doesn't matter which one you calculate first as long as you do not calculate multiplication and division before what's in the parenthesis and before all the exponentials. Also, you must calculate the multiplication and division before you add or subtract.

4) Once you have done your parenthesis, exponents, multiplication and division, all you will have left of your problem is the addition and subtraction calculations to perform. You should add or subtract left to right. It does not matter which one comes first as long as you do not calculate addition and subtract before all the other operations. Addition and subtract is the last operations in the order of operations.

Let's look at an example

$$(10 - 5) \times 3 - 1(8/2)$$

Remember PEMDAS!

Do what's in parenthesis first that $(10\text{-}5)$ **and** $(8/2)$ **you work the calculations out and place the answer back in to the problem in the same spot. So now you have**

$$5 \times 3 - 1(4)$$

Next is exponents, we have no exponents to calculate in this problem so we move on to multiplication and division.

$$5 \times 3 = 15 \text{ and } 1(4) = 4$$

$$15 - 4$$

We only have subtraction left.

Your answer to this problem is 11**.**

Find the answer to the order of operations.

1) $9 + 10 \times (6 + 2)$

2) $14 - 7 \times 3$

3) $15/5 \times 5 + 3$

4) $22 + 3 \times (8 \div 2) - 6$

5) $(3 + 4) \times (6 \div 3)$

6) $18 + 6 - 4 - 2$

Answers on page 68

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Chapter 2: Factors and Fractions

Factors and Multiples

In an earlier section, we discussed factors and multiples.

Factor x factor = multiple

$$2 \times 3 = 6$$

2 and 3 are factors of 6, and 6 is a multiple of 2 and 3. A factor of a number can be evenly divisible into a number or a multiple. All the factors of 6 are 1, 2, and 3.

Find the factors for the multiples below.

1) 15:
2) 40:
3) 36:
4) 9:
5) 24:
6) 12:
7) 10:
8) 18:

Answers on page 64

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Fraction Basics

It's important that you know how to work with fractions if you are going into any health care field.

A fraction is a part of something. Fractions represent a part of a whole. All fractions have a numerator, a denominator and a fraction bar between the numerator and the denominator. The numerator represents the part and denominator represents the whole. The fraction bar is actually another symbol for division.

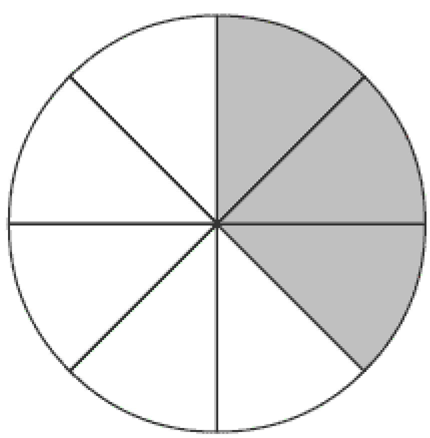
Fraction Bar

$$\frac{\textbf{Numerator}}{\textbf{Denominator}}$$

$\frac{3}{8}$	**The number** 3 **is the numerator.** **The number** 8 **is the denominator**

The numerator represents how many pieces of the whole we are working with. The number 8 is the denominator. The denominator represents how much in all you have.

Example:
Let's say that a petri dish was cut into 8 equal sections to test a microorganism, 3 of the sections were used. The fraction $\frac{3}{8}$ tells you how many parts of the petri dish you used. The following petri dish shows 3 of the 8 sections (the ones you used) shaded.



Identify the numerators and denominators from each fraction.

	Numerator	Denominator
1) $\frac{3}{4}$	___________	___________
2) $\frac{2}{5}$	___________	___________
3) $\frac{6}{8}$	___________	___________
4) $\frac{1}{12}$	___________	___________
5) $\frac{4}{9}$	___________	___________
6) $\frac{8}{10}$	___________	___________
7) $\frac{11}{13}$	___________	___________
8) $\frac{6}{9}$	___________	___________
9) $\frac{14}{32}$	___________	___________
10) $\frac{1}{3}$	___________	___________

Answers on page 69

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Proper Fractions

Proper fractions are called proper because the top number or numerator of the fraction is smaller than the value of the denominator of a fraction. Below are some examples of proper fractions.

$$\frac{1}{2} \qquad \frac{6}{12} \qquad \frac{3}{6} \qquad \frac{2}{4}$$

Proper fraction values are less than 1. As the numerator gets bigger and gets closer to the value of the denominator, the closer to 1 the value of the fraction is.

$\frac{1}{6}$ **is less than** $\frac{2}{6}$

As the numerator gets larger, the closer to 1 **the value of the fraction becomes.**

$\frac{6}{6}$ **is equal to** 1

When the numerator and the denominator are the same number the fraction equals 1.

$$\frac{8}{8} = 1 \qquad \frac{12}{12} = 1$$

Improper Fractions

Fractions are considered improper when the numerator or the top number of a fraction is greater than the value of the denominator or the bottom number in a fraction. Below are examples of improper fractions. Improper fractions are bigger than the value of 1. This means the fraction is now greater than one whole.

$$\frac{12}{6} \qquad \frac{24}{2} \qquad \frac{5}{4} \qquad \frac{13}{8}$$

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Mixed Numbers

Mixed numbers are numbers that have a whole number and fraction together. Below are some examples of what a mixed number looks like.

$$1\frac{1}{2} \qquad 2\frac{6}{8} \qquad 5\frac{3}{12}$$

Next to the fraction, write if the fraction is proper, improper or mixed.

1) $\frac{8}{6}$

2) $3\frac{1}{4}$

3) $\frac{2}{12}$

4) $\frac{4}{8}$

5) $\frac{15}{5}$

6) $5\frac{2}{8}$

7) $\frac{12}{8}$

8) $8\frac{3}{4}$

Answers on page 69

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Changing Improper Fractions into Mixed Numbers

You can change improper fractions into mixed or whole numbers and you can change mixed numbers into improper fractions.

If you have an improper fractions such as $\frac{9}{4}$ **you can change it into a mixed number. Fractions have a division bar.** $\frac{9}{4}$ **Means** 9 **divided by** 4**.**

You ask yourself the same question as you would when you have to work out a division problem.

How many groups of 4 **can I get out of** 9**? You can get** 2 **groups of** 4 **out of** 9**. So your whole number is** 2**. We still need to get the numerator and the denominator for this mixed number.**

$$2\frac{?}{?}$$

After you get your groups of 4 from 9, what is left over? 1 is left over. This is your numerator.

$$2\frac{1}{?}$$

For the denominator, you simply keep the same denominator you had, which is 4.

$$2\frac{1}{4}$$

Sometimes you will have an improper fraction that will divide evenly.

$$\frac{12}{3}$$

You would ask yourself the same division question. How many groups of 3 can I get out of 12? You can get 4 groups of 3 out of 12. You have no remainders. So your answer would simply be 4.

Change each improper fraction to a mixed number

1) $\frac{5}{3}$

2) $\frac{9}{5}$

3) $\frac{10}{2}$

4) $\frac{7}{4}$

5) $\frac{18}{12}$

6) $\frac{12}{4}$

7) $\frac{3}{1}$

8) $\frac{6}{5}$

9) $\frac{11}{9}$

10) $\frac{4}{2}$

Answers on page 69

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Changing Mixed Numbers into Improper Fractions

Changing mixed numbers into improper fractions is simple. Let's say you want to change $2\frac{3}{4}$ to an improper fraction.

You would multiply the denominator and the whole number; add the numerator to your answer. This would be your new numerator and you would keep the same denominator.

Denominator * whole number + numerator = new numerator

Keep the same denominator…

$$2\frac{3}{4}$$

$4 \text{ x } 2 = 8 + 3 = 12$ **as the numerator**

Keep the same denominator 4

$$2\frac{3}{4} = \frac{12}{4}$$

Change the mixed numbers to improper fractions

1) $3\frac{2}{3}$ 2) $4\frac{6}{7}$ 3) $1\frac{2}{3}$ 4) $5\frac{4}{9}$ 5) $2\frac{1}{8}$

6) $11\frac{3}{4}$ 7) $10\frac{5}{6}$ 8) $6\frac{2}{8}$ 9) $8\frac{12}{15}$ 10) $14\frac{7}{8}$

Answers on page 70

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Reducing Fractions

Reducing a fraction means writing the fraction in *lowest terms*. Writing a fraction in lowest terms is getting the numerator and the denominator down to the smallest numbers possible.

For example let's say you have the fraction below

$$\frac{3}{12}$$

The way you reduce a fraction to its lowest term is finding a greatest common factor among the numerator and the denominator. It's the same process as finding the lowest common factor except, you want to pick out the number that appears in both lists that is the greatest or the biggest and not the least or smallest.

3: 1, 2, 3
12: 1, 2, 3, 4, 6, 12

The biggest number in both lists is 3. This is the number you will use to reduce, or get your fraction to lowest terms.

$$\frac{3 \div 3}{12 \div 3} = \frac{1}{4}$$

Reduce the fractions below.

1) $\frac{2}{8}$	2) $\frac{7}{14}$	3) $\frac{15}{5}$	4) $\frac{6}{18}$	5) $\frac{11}{44}$
6) $\frac{16}{24}$	7) $\frac{45}{50}$	8) $\frac{2}{4}$	9) $\frac{3}{9}$	10) $\frac{60}{100}$

Answers on page 70

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Multiplying Proper Fractions

You will multiply fractions frequently in the health field arena. Multiplying fractions is very simple. All you do is multiply the numerators straight across and then multiply the denominators straight across.

You do not need to find a common denominator when you are multiplying fractions or when you are dividing fractions. You only have to find the common denominators among fractions when you are adding or subtracting fractions.

$$\frac{2}{4} \times \frac{3}{5} = \frac{6}{20}$$

You can now reduce $\frac{6}{20}$ to $\frac{3}{10}$

Multiply the proper fraction, reduce and simplify your answers.

1) $\frac{1}{2} \times \frac{3}{4}$ 2) $\frac{4}{8} \times \frac{4}{6}$ 3) $\frac{2}{3} \times \frac{16}{24}$ 4) $\frac{6}{8} \times \frac{5}{12}$

Answers on page 71

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Dividing Proper Fractions

Dividing fractions is just like multiplying fractions, as a matter of fact, you will turn all your division problems into multiplication problems. In order to divide fractions you must first invert, flip or take the reciprocal of the second fraction and then multiply. That's it!

Let's look at an example.

$$\frac{1}{2} \div \frac{3}{4} =$$

Next, you are going to replace the division sign with a multiplication sign and then invert, flip or take the reciprocal of the second fraction.

$$\frac{1}{2} \times \frac{4}{3} = \frac{4 \div 2}{6 \div 2} = \frac{2}{3}$$

You multiply the numerators straight across the top, and you take the denominators and multiply them straight across the bottom. The answer was $\frac{4}{6}$, you can reduce with a 2, so your answer is $\frac{2}{3}$.

If you have fractions to divide that are mixed numbers, you must first turn the mixed numbers into improper fractions and then divide.

$2\frac{3}{4} \div 1\frac{3}{8}$ **Convert to improper fractions, invert the second fraction and replace division sign with multiplication sign** $\frac{11}{4} \times \frac{8}{11} = \frac{88}{44} = 22$

Divide the fractions and reduce and simply your answers.

1) $\frac{1}{2} \div \frac{3}{4}$ 2) $\frac{4}{8} \div \frac{4}{6}$ 3) $\frac{2}{3} \div \frac{16}{24}$ 4) $\frac{6}{8} \div \frac{5}{12}$

Answers on page 71

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Changing Fractions to Decimals

In earlier sections of this workbook, we talked about division and the division bar. You simply divide the numerator by the denominator. The numerator is the dividend and the denominator is the divisor. Some times when you divide a fraction, you will get a decimal answer.

$$\frac{5}{8} \text{ or } 5 \div 8 = 0.625$$

Change the fractions below to decimals.

1) $\frac{1}{2}$ 2) $\frac{3}{4}$ 3) $\frac{1}{12}$ 4) $\frac{3}{8}$ 5) $\frac{3}{6}$

Answers on page 71

Changing Fractions to Percent's

Now that you know how to change a fraction to a decimal, it is fairly simple to change a fraction to a percent. In order to change a fraction to a percent, you must first change the fraction to a decimal and then to a percent. $\frac{5}{8}$ or $5 \div 8 = 0.625$

The decimal answer is 0.625, in order to change the decimal answer into a percent all you have to do is move the decimal point two times to the right. $0.625 = 62.5\ \%$

You drop the zero off the front since it's not holding a place. You will always move the decimal point only two places to the right.

Change the fractions below to decimals and then to percent's.

1) $\frac{1}{2}$ 2) $\frac{3}{4}$ 3) $\frac{1}{12}$ 4) $\frac{3}{8}$ 5) $\frac{3}{6}$

Answers on page 71

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Chapter 3: LCM and Fractions

Lowest Common Multiple

When you want to find the lowest common Multiple (LCM), you can find the lowest common multiple among any numbers. Let's pick two numbers, how about 3 and 5.

First, you want to get all the multiples of 3 or you want to get all the multiplicative answers by multiplying 3 with other numbers or other factors. You want to start to multiply the number first by one and then two and so on.

$$3 \times 1 = 3$$
$$3 \times 2 = 6$$
$$3 \times 3 = 9$$
$$3 \times 4 = 12$$
$$3 \times 5 = 15$$

So the multiples of 3 are, 3, 6, 9, 12, and 15

We sometimes signify this by writing it this way.

$3: 3, 6, 9, 12, 15, 18$ **and so forth**

Next let's get the multiples of 5

$$5 \times 1 = 5$$
$$5 \times 2 = 10$$
$$5 \times 3 = 15$$
$$5 \times 4 = 20$$
$$5 \times 5 = 25$$

The multiples of 5 are 5, 10, 15, 20, 25 and so forth

$5: 5, 10, 15, 20, 25$

If we line both our list up it would look like this

3: 3, 6, 9, 12, 15
5: 5, 10, 15, 20, 25

So now that you have your list lined up, you want to select the number that is the smallest and shows up first in both lists?

3: 3, 6, 9, 12, 15
5: 5, 10, 15, 20, 25

15 is the correct answer

Find the lowest common multiple for the numbers below.

1) 8:
   3:

2) 6:
   9:

3) 5:
   15:

4) 20:
   15:

Answers on page 71

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Lowest Common Denominator

Sometimes more than one number can appear in both lists. But, the number you will use will be the lowest number from both list. This is why it's called the lowest common multiple, and you will also use this same strategy to find the lowest common denominator (LCD). They are the same techniques, just used for different circumstances.

When you want to add or subtract a fraction, they must have the same denominator. If the fractions that you are adding or subtracting do not have the same denominator, you can't add or subtract them. You have to get the same denominator for the fractions or equivalent fractions.

Below are two fractions. The denominators for the fractions are 4 and 3. To find the lowest common denominator, you must first find the multiples of 4 and 3.

$$\frac{1}{4} \quad \text{and} \quad \frac{2}{3}$$

4: 4, 8, 12, 16, 20, 24
3: 3, 6, 9, 12, 15, 18

The number that appears first and is the smallest in both lists is 12, so that is your lowest common denominator.

Look at the fractions below. Find the lowest common denominator for each fraction.

5) $\frac{3}{6}$ and $\frac{1}{2}$ LCD =

6) $\frac{8}{8}$ and $\frac{9}{16}$ LCD =

7) $\frac{5}{20}$ and $\frac{4}{5}$ LCD =

8) $\frac{5}{8}$ and $\frac{6}{24}$ LCD =

Answers on page 71

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Adding and Subtracting Proper Fractions with Like Denominators

Adding and subtracting proper fractions is simple when you have the same denominator. If you have fractions that you are trying to add or subtract, they must have the same denominator.

If a fraction does not have the same denominator, you cannot add or subtract the fractions. You must find equivalent fractions that have the same denominator to add or subtract fractions.

You do not have to have the same denominator to multiply or divide fractions. If the fractions have the same denominators, then you only add or subtract the numerators and you keep the denominators the same.

Let's look at an example below.

$$\frac{2}{6} + \frac{1}{6} = \frac{3}{6} \quad \text{OR} \quad \frac{2}{6} - \frac{1}{6} = \frac{1}{6}$$

Add or subtract the problems below.

1) $\frac{6}{12} - \frac{4}{12}$ 2) $\frac{2}{3} - \frac{1}{3}$ 3) $\frac{4}{10} + \frac{3}{10}$ 4) $\frac{5}{7} + \frac{2}{7}$

5) $\frac{3}{5} + \frac{1}{5}$ 6) $\frac{5}{8} - \frac{5}{8}$ 7) $\frac{2}{7} - \frac{1}{7}$ 8) $\frac{2}{9} + \frac{5}{9}$

Answers on page 71-72

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Adding and Subtracting Proper Fractions with Unlike Denominators

Previously, we covered finding the Lowest Common Denominator (LCD).

When you want to add or subtract a fraction, they must have the same denominator. If the fractions that you are adding or subtracting do not have the same denominator, you have to get the same denominator for the fractions or equivalent fractions.

Below are two fractions you need to add. The denominators for the fractions are 4 and 3. To find the lowest common denominator, you must find the multiples of 4 and 3.

$$\frac{1}{4} + \frac{2}{3}$$

4: 4, 8, 12, 16, 20, 24
3: 3, 6, 9, 12, 15, 18

The number that appears first and is the smallest in both lists is 12, so that is your lowest common denominator. You use the same strategy to get your lowest common denominator that you use to get your lowest common multiple.

In order to add the two fractions, we must show their equivalents.

We decided that 12 will be our denominator

$$\frac{1}{4} = \frac{?}{12} \text{ And } \frac{2}{3} = \frac{?}{12}$$

We must always get our denominators first. Once we determine our denominators, we can find our numerators to our equivalent fractions.

$$\frac{1}{4 \times 3} = \frac{?}{12}$$

In order for the denominator 4 to equal 12, we had to multiply it by 3. What you do to the bottom of a fraction, you do to the top of the fraction. What you do to the denominator you do to the numerator. Since you multiplied the denominator by 3, you must multiply the numerator by 3 to get an equivalent fraction.

$$\frac{1 \times 3}{4 \times 3} = \frac{3}{12} \quad so \quad \frac{1}{4} = \frac{3}{12}$$

You will find that if you reduce $\frac{3}{12}$ it would reduce to $\frac{1}{4}$, these are equivalent fractions.

Let's get the equivalent fraction for the second fraction $\frac{2}{3}$.

$$\frac{2}{3} = \frac{?}{12}$$

Next,

$$\frac{2 \times 4}{3 \times 4} = \frac{8}{12}$$

We had to multiply both denominator and numerator by 4 because our denominator needed to be 12.

Now we can add our equivalent fractions together.

$$\frac{3}{12} + \frac{8}{12} = \frac{11}{12}$$

Add or Subtract the Proper Fractions with unlike denominators.

1) $\frac{3}{4} - \frac{2}{12}$

2) $\frac{12}{24} - \frac{1}{3}$

3) $\frac{4}{10} + \frac{5}{5}$

4) $\frac{5}{7} + \frac{2}{21}$

5) $\frac{3}{5} + \frac{1}{25}$

6) $\frac{5}{8} - \frac{4}{16}$

7) $\frac{16}{27} - \frac{1}{9}$

8) $\frac{2}{9} + \frac{5}{36}$

Answers on page 72

Chapter 4: Mixed Numbers

Multiplying Mixed Numbers

Sometimes, you might see a problem like this,

$$4 \times \frac{1}{2}$$

It's confusing because you do not know what to multiply, is the 4 a numerator or a denominator?

The 4 is a numerator. All whole numbers go in the numerator part of the fraction. What about the denominator? What do you do about that?

When you have a whole number like the number 4 and you put it in the numerator spot, then you must put the number 1 in the denominator spot. So, now you have...

$$\frac{4}{1} \times \frac{1}{2} = \frac{4}{2} = 2$$

This is an improper fraction, after you divide, the answer will be 2.

Sometimes, you may have to multiply a fraction and a mixed number or two mixed numbers. In this case, before you multiply or divide, you must convert all mixed numbers to improper fractions. Again, you must convert all mixed numbers to improper fractions when you are multiplying or dividing.

However, this is not the case for adding and subtracting fractions.

Let's look at an example

$$2\frac{1}{2} \times 3\,\frac{2}{4}$$

You must convert all mixed numbers to improper fractions,

$$\frac{5}{2} \times \frac{14}{4}$$

Now, you multiply the numerators and the denominators

$$\frac{70}{8}$$

This is an improper fraction, and we need to turn it into a mixed number. 8 goes into 70, 8 times with 6 left over and 8 is still our denominator.

$$8\frac{6}{8}$$

6/8 can still be reduced, our final answer is

$$8\frac{3}{4}$$

Multiply the fractions below. Simplify your answers.

1) $4\frac{3}{4} \times \frac{1}{2} =$

2) $3\frac{2}{8} \times 6 =$

3) $1\frac{6}{9} \times 5\frac{1}{4} =$

4) $8 \times \frac{3}{4} =$

5) $1\frac{8}{10} \times 2\frac{6}{7} =$

6) $1\frac{3}{4} \times 4 =$

7) $2\frac{6}{12} \times \frac{2}{3} =$

8) $4\frac{1}{2} \times 5\frac{6}{7} =$

9) $3\frac{1}{6} \times 2\frac{3}{8} =$

10) $5\frac{4}{9} \times 7 =$

Answers on page 72

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Dividing Proper and Mixed Fractions

When dividing mixed fractions, you must first convert all mixed numbers to improper fractions. Dividing mixed numbers is just like multiplying mixed fractions, as a matter of fact, you will turn all your division problems into multiplication problems. In order to divide fractions you must first invert, flip or take the reciprocal of the second fraction after you have converted it to an improper fraction. That's it!

Let's look at an example.

$$3\frac{2}{3} \div 2\frac{1}{2} =$$

First, you are going to Change the mixed numbers to improper fractions, then replace the division sign with a multiplication sign and then invert, flip or take the reciprocal of the second fraction.

$$3\frac{2}{3} \div 2\frac{1}{2} = \frac{11}{3} \times \frac{2}{5}$$

You multiply the numerators straight across the top, and you take the denominators and multiply them straight across the bottom. The answer is $\frac{22}{15}$.

Let's look at another example.

$$2\frac{3}{4} \div 1\frac{3}{8}$$

Convert the mixed numbers to improper fractions, then invert the second fraction and replace division sign with multiplication a sign

$$\frac{11}{4} \times \frac{8}{11} = \frac{88}{44} = 22$$

Divide the fractions below. Simplify your answer.

1) $\frac{3}{4} \div \frac{6}{8}$

2) $3\frac{2}{4} \div 2\frac{1}{6}$

3) $5\frac{9}{12} \div \frac{4}{8}$

4) $\frac{5}{12} \div \frac{1}{8}$

5) $\frac{6}{8} \div 4$

6) $2\frac{2}{9} \div \frac{3}{5}$

7) $\frac{8}{9} \div \frac{1}{2}$

8) $2\frac{6}{12} \div 1\frac{2}{4}$

9) $5 \div \frac{5}{15}$

10) $6\frac{9}{10} \div 3$

Answers on page 73

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Adding and Subtracting Mixed Numbers with Like Denominators

Adding and subtracting mixed numbers with like denominators is similar to adding and subtracting proper fractions. The only difference is now you have a whole number in which you need to add or subtract in addition to the fraction.

$$\begin{array}{r} 3\frac{2}{6} \\ +2\frac{1}{6} \\ \hline 5\,\frac{3}{6} \end{array}$$

Add or subtract the mixed numbers with like denominators. Simplify your answers.

1) $2\frac{3}{4} + 3\ \frac{1}{4}$

2) $3\frac{2}{4} - 2\frac{1}{4}$

3) $5\frac{9}{12} + \ 2\frac{3}{12}$

4) $2\frac{2}{9} + \ 1\frac{3}{9}$

5) $6\frac{8}{9} - \ 4\frac{2}{9}$

6) $2\frac{6}{12} + 1\frac{2}{12}$

Answers on page 73

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Adding and Subtracting Mixed Numbers with Unlike Denominators

Adding and subtracting mixed numbers with unlike denominators is similar to adding and subtracting fractions with unlike denominators. The only difference is now you have a whole number in which you need to add or subtract in addition to finding the common denominator among the fractions.

Find the LCD of 6 and 12 and make this your denominator for both fractions to get equivalencies.

6: 6, 12, 18, 24, 30
12: 12, 24, 36

$$3\frac{2\times 2}{6\ \times 2} = 3\frac{4}{12}$$

$$+2\frac{1\ \times 1}{12\ \times 1} = 2\frac{1}{12}$$

$$5\ \frac{5}{12}$$

Add or subtract the mixed fractions below. Simplify your answers.

1) $1\frac{1}{2}\ +\ 3\frac{3}{4}$ 2) $2\frac{4}{8} +\ 1\frac{4}{6}$ 3) $6\frac{2}{3} -\ 1\frac{2}{24}$

4) $4\frac{21}{24} - \ \frac{5}{12}$ 5) $3\frac{1}{2} + 1\ \frac{3}{4}$

Answers on page 73

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Subtracting Mixed Numbers and Borrowing

Subtracting fractions can be challenging when you have to borrow. Let's look at a problem in which you may have to borrow.

$$6\frac{2}{3} - 1\frac{5}{6}$$

First, you must find the lowest common denominator. The lowest common denominator of 3 and 6 is 6.

$$6\frac{2 \times 2}{3 \times 2} = 6\frac{4}{6}$$

$$-1\frac{5 \times 1}{6 \times 1} = 1\frac{5}{6}$$

You cannot take 5 from 4 because there is not enough. In this case, you must borrow from the 6. When you borrow from the 6, you will borrow a whole number, you will borrow 1. But, you must convert the 1 into fractional from. So you will borrow 1 from 6 and make it $\frac{6}{6}$ and add it to the fraction that does not have enough.

$$6\frac{4}{6} \rightarrow 5\frac{6}{6} + \frac{4}{6} = 5\frac{10}{6}$$

Your new problem looks like this

$$5\frac{10}{6}$$

$$-1\frac{5}{6}$$

Now, you can subtract, the answer is $4\frac{5}{6}$

Subtract the fractions below.

1) $4\frac{1}{2} - 3\frac{3}{4}$

2) $2\frac{4}{8} - 1\frac{5}{6}$

3) $6\frac{2}{3} - 1\frac{12}{24}$

4) $4\frac{1}{24} - \frac{10}{12}$

5) $3\frac{1}{5} - 1\frac{3}{4}$

Answers on page 74

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Chapter 5: Ratios, Rates, and Percent

Ratios

A ratio is a comparison between two different things. For example, you might what to find out what's the ratio of female patients to male patients that go to the doctor on a daily basis. Let's say that there are 10 female patients that go to the doctor compared to 15 male patients that go to the doctor on a daily basis. We signify that this is a ratio by placing a colon between the two numbers.

10:15

It is very important that when you are doing ratios you place the numbers in the order in which they are given, otherwise, you will have an incorrect expression. Another way that people show ratio is by fractional form.

$$\frac{10}{15}$$

You can also use the word "to" between the numbers. This also signifies that this is a ratio.

10 to 15

A ratio is not solved. A ratio can be reduced, but it is not a mathematical equation that needs to be solved. A ratio is simply a mathematical expression.

Write the correct ratio expression in all three forms.

1) 20 male patients are admitted to the emergency to every 5 female patients.
2) 5 tablets to every 350 mg
3) 10 tablets to every 300 mL
4) An insurer uses 80 cents out of every 1 dollar to pay its customers' medical claims
5) A health insurer spends 85% leaving 15% for profit and non-medical costs

Answers on page 74

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Proportion

As stated previously, a ratio is not solved. A ratio can be reduced, but it is not a mathematical equation that needs to be solved. A ratio is simply a mathematical expression.

However, a proportion is two ratios that have been set to equal each other. The two ratios are written in fractional form, thus, they are considered proportional because they have an equal sign between them.

$$\frac{3}{4} = \frac{6}{8}$$

Proportions are equations that can be solved. Solving a proportion means that you are missing one part of one of the fractions, and you need to solve for that missing value. Let's look at an example of why you would need to solve a proportion.

$$\frac{?}{12} = \frac{1}{4}$$

We are missing the number that goes where the question mark is. Typically a variable is placed in that space like x or n. Like this

$$\frac{x}{12} = \frac{1}{4}$$

We need to solve for x. To solve this equation of proportions, you will need to cross multiply. You would multiply the denominator from one fraction by the numerator of the other fraction for both sides and then set them equal to each other.

$$12 \times 1 = 12 \quad \text{and} \quad 4 * x = 4x$$

Solve for x

$$4x = 12$$

$$\frac{4x}{4} = \frac{12}{4}$$

$$X = 3$$

Solve for x the proportions problems below.

(1) $\frac{9}{2} = \frac{x}{4}$

(2) $\frac{x}{6} = \frac{4}{12}$

(3) $\frac{8}{16} = \frac{5}{x}$

(4) $\frac{6}{x} = \frac{3}{6}$

Answers on page 74

In the medical field, you will use ratios and proportions a lot if you are trying to figure out dosages.

There is multiple dosage formulas in which you will have to use proportions based on the information that is given to you.

Example: Verapamil is ordered 25 mg PO. Verapamil is available as 50 mg tablets. How many tablets would the nurse administer?

$$\frac{50\text{ mg}}{1\text{ tablets}} = \frac{25\text{ mg}}{x\text{ tablets}}$$

You would cross multiply,

$$\frac{50\text{ mg}}{1\text{ tablets}} = \frac{25\text{ mg}}{x\text{ tablets}}$$

$$50\text{ mg} * x\text{ tablets} = 25\text{ mg} * 1\text{ tablet}$$

Solve for x tablets, divide 50 mg by both sides

$$\frac{50\text{ mg} * x\text{ tablets}}{50\text{mg}} = \frac{25\text{ mg} * 1\text{ tablet}}{50\text{mg}}$$

Cancel the units and divide the numbers

X tablets = 0.5 * 1 tablet

X tablets = 0.5 tablets

X = 0.5

Complete the proportion questions below.

1. The order is for Aspirin 125 mg. The medication is available in 25 mg tablets. How many tablets should be given to the patient?

2. The doctor orders 160 mg of medication. The medication is available in 80 mg tablets. How many tablets should be given?

3. The order is for a dose of 300,000 units of penicillin. The capsules are available in 100,000 units. How many capsules are given per dose?

4. If a patient is to receive Drug B , 10 mg and the label says each tablet is 2.5 mg, how much of Drug B would you give the patient?

Answers on page 74

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Rate

A rate is an amount of one thing considered in relation to a unit of another thing and used as a standard of measure.

For example, you could be driving at a rate of 65 miles per hour.

Once you have a rate that is the standard, you can use it to calculate other variables within a problem.

How long will it take you if you had to drive 650 miles?

$$\frac{65 \text{ miles}}{1 \text{ hours}} = \frac{650 \text{ miles}}{x \text{ hours}}$$

You would cross multiply as you did with proportions to solve rates as well. You can use the same strategy you use to solve proportions. When you set up your problems, make sure the units that are equal to each other is directly across from each other. As you can see from the problem above, the miles are across from the miles and the hours are across from the hours.

$$(65 \text{ miles })(x \text{ hours}) = (650 \text{ miles})(1 \text{ hour})$$

We are solving for x, the unknown value so we need to get rid of the 65 miles. Since we are multiplying 65 miles, we need to divide on both sides.

$$\frac{(65 \text{ miles })(x \text{ hours})}{65 \text{ miles}} = \frac{(650 \text{ miles})(1 \text{ hour})}{65 \text{ miles}}$$

Next we can cancel the like terms and we also can divide.

$$\frac{(65 \text{ miles })(x \text{ hours})}{65 \text{ miles}} = \frac{(650 \text{ miles})(1 \text{ hour})}{65 \text{ miles}}$$

$$X \text{ hours} = (10)(1 \text{ hours})$$
$$X \text{ hours} = 10 \text{ hours}$$

$$X = 10$$

Given the standard rate, solve the problems below.

1) A pharmacist is catching a plane to attend a seminar in Las Vegas. The plane made a trip to Las Vegas and back. On the trip there it flew 432 mi/hr. and on the return trip it went 480 mi/hr. How long did the trip there take if the return trip took nine hours?

2) Claire drove at an average speed of 40 km/hr. After driving for five hours, how far had Claire driven?

3) Over a period of 1 week, 180 people are discharged from the hospital. At this rate, how many people will have been discharged from the hospital in a 4 week period?

4) If a traveling pharmaceutical sales person drove a total of 296 miles and used 14 gallons of gasoline. What is this rate in miles per gallon?

5) An orderly can change 5 bedding sheets in 20 minutes. What is the rate in which they can change sheets per hour?

Answers on page 74

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Chapter 6: Percent

Percent Basics

Percent means 1/100 part. A percent is the part of 100. If you have something that is 30%, this means its 30 parts of 100. Percent's can always be expressed as fractions.

$$\frac{30}{100}$$

When you are expressing percent as a fraction, you always place 100 as the denominator.

Fractions, percent's, and decimals can be converted among each other. If you know the fraction of a number, then you can get the decimal and the percent of the number, if you know the decimal of a number, you can also get the fraction and the percent of that same number.

Fractions, percent and decimals are interchangeable.

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Changing percent to fractions

When you change a percent to a fraction, you take the number that's the percent and make it the numerator and drop the percent symbol. Next, you always, always make 100 as your denominator when you are changing percent to fractions. Finally, you reduce and simplify your answers.

$$75\% = \frac{75}{100} = \frac{75 \div 25}{100 \div 25} = \frac{3}{4}$$

Change the following percent into fractions. Don't forget to reduce if possible.

1) 25%

2) 50%

3) 3%

4) 125%

5) 10 %

Answers on page 74-75

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Changing percent to decimals

When changing percent to decimals, the only thing you have to do is drop the percent symbol and then move the decimal from right to left two times.

50%

50

Don't forget that there is a decimal point behind each whole number, it's not always indicated.

50.

0.50

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Translating Percent Problems

You can also calculate percent based on different situations. You might need to find the percent of a certain number, you may need to find out a number given a certain percent.

In these cases, you can translate an English statement into a mathematical statement.

Word	**Translation**	**Meaning**
What	**n**	**Variable, unknown**
of	**x**	**Multiplication symbol**
is	**=**	**Equal sign**

Let's translate the percent question below using the chart.

What percent of 20 is 30?

First, you substitute the words for symbols and you leave the numbers in the location that they are in to complete the number sentence so that it can be solvable.

$$n \times 20 = 30$$

We need to solve for n, since 20 is being multiplied by n, we need to divide 20 on both sides to solve for n.

$$\frac{n \times 20}{20} = \frac{30}{20}$$

$$n = \frac{30}{20} = 1.5$$

Since n stands for a percentage, we need to convert the decimal answer back into a percentage:

$$1.5 = 150\%$$

Thirty is 150% of 20.

Let's look at another example.

What is 35% of 90?

$$n = 35\% \times 90$$

When you have a problem like this, you must always convert the percent into a decimal before you can work out the problem.

$$n = 0.35 \times 90$$

Now you have converted an English statement into a number sentence that you can calculate.

Solve for n.

$$n = 31.5$$

31.5 is 35% of 90

Solve the percent problems below.

1) What is 96% of 20

2) What is 31% of 98

3) What is 18% of 43

4) What percent of 190 is 19

5) What percent of 610 is 24

6) What percent of 808 is 82

Answers on page 75

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Chapter 7: US and Metric Measurement

United States Measurement

The United States has its own measurement system sometimes called the customary system or the English system. In this workbook, we are going to refer to the United States measurement system as the customary system.

The United States customary system units are:

Time

60 seconds = 1 minute
60 minutes = 1 hour
24 hours = 1 day
7 days = 1 week
12 months = 1 year
52 weeks = 1 year
100 years = 1 century

Length

12 inches = 1 foot
36 inches = 1 yard
3 feet = 1 yard
5,280 feet = 1 mile
1,760 yards =

Capacity and Weight

2 tablespoons = 1 fluid ounce
8 fluid ounces = 1 cup
2 cups = 1 pint
2 pints = 1 quart
2 quarts = ½ gallon
16 ounces = 1 pound

2,000 pounds = 1 ton
4 cups = 1 quarts
16 cups = 1 gallon
8 pints = 1 gallon
4 quarts = 1 gallon

Solve the customary measurement problems below.

1. How many quarts are equivalent to 16 pints?
2. How many seconds are in 10 minutes?
3. The humidifier for the nursing station holds 4 gallons of water. How many ounces will completely fill the humidifier reservoir?
4. An IV was administered for 287 minutes. How many hours and minutes was the IV running?
5. There are 2 bottles of milk of magnesia on the shelf at the pharmacy. The first one contains 11.6 oz. and the other has 2 cups. Which has the larger volume?

Answers on page 75

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Global Metric System

Other countries use a measurement system call the metric system. The United States customary system units are converted and used within the metric system. We use these units all over the world including the United States.

The units for the metric system have base units. The base units are manipulated based on the metric systems prefixes. Depending on what prefix is in front of the base unit determines the amount or value of the base unit. You will use the metric system to help you calculate dosages in the medical field.

Base units are grams, meters, and liters

The prefixes are kilo, hecto, deca, deci, centi, milli, and micro. There are many, many more prefixes but you will mainly see these prefixes used in the health field.

The prefixes have a value

(K) Kilo = 1,000
(h) hecto = 100
(da) deca = 10
(d) deci = 0.1
(c) centi = 0.01
(m) milli = .001
(mc) micro =.000001

If you have 1 kilogram, 1 kilogram = 1,000 grams
If you have 1 kilometer, 1 kilometer = 1,000 meters
If you have 1 kiloliter, 1kiloliter = 1,000 liters

The same goes for all the prefixes and the bases.

But, what if I have 3 kilograms? How many grams is that?

Let's look at this as a number problem.

3 kilograms =? grams

3 x 1000 x grams = 3000 grams

You can convert easily.

Let's do another one except with a smaller prefix value.

5 centimeters =? meters

5 x .01 x meter = 0.05 meters

How many micrograms are in a gram? Let's put it in a number sentence.

.000001 x grams = .000001 grams

Solve the metric system problems below.

6) 990 mm =____ m

7) 1 g = ___ mg

8) 650 mg = ____ g

9) 0.5 L = ___ mL

10) 1.2 g = ____ mg

Answers on page 75

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Chapter 8: Statistics

Let's say you did a survey and asked seven doctors how many prescriptions they wrote in one day. Below are the numbers they gave you.

12, 5, 8, 24, 12, 14,15

In order to move further and analyze this data, you must first rearrange the numbers and put then from least to greatest.

5, 8, 12, 12, 14, 15, 24

Once you have your data set in a list from least to greatest, now you can begin to analyze your data using statistical tools. The first tool we are going to discuss is mode.

Mode

Mode **is the number that shows up the most in a set of data**

$$5, 8, 12, 12, 14, 15, 24$$

The number in this list that shows up the most is 12. 12 is your mode in this set of data.

Let's say that the list below is your set of data.

$$5, 8, 12,14, 15, 24$$

There is no number that shows up the most in this list so, this set of data has no mode. This is a no modal set of data.

Let's look at a similar set of data.

$$5, 8, 12, 12, 14, 15, 24, 24$$

As you can see here, we have two numbers 12 and 24 that show up in our set of data the most. In this set of data, this is called bimodal. Yes, you can have more than one mode.

Median

Median **is the middle number in a set of data.**

5, 8, 12, 12, 14, 15, 24

To find the median you simply find the middle number and that's your median. In the set of data above, the median is 12. This works for a set of data that has an uneven amount of data set. There will always be a middle number. What do you do if you have an even data set? You take the two middle numbers, add them together and divide by 2 and that is how you get the median.

5, 8, 12, 12, 14, 15, 24, 24

The two middle numbers here are 12 and 14. 12 + 14 =26, take 26 and divide by 2 = 13. Your median for this set of data is 13.
Range is the difference of the highest value in the set of data subtracted from the lowest value set of data.

5, 8, 12, 12, 14, 15, 24

The highest number in our data set is 24, the lowest number is 5. To get the range we must subtract 24 – 5=19. The range for this set of data is 19.

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Mean

Mean **is the average of a set of data, to get the mean or average you add up all the values in a set of data and then divide by how many values you have in that set of data.**

$$5, 8, 12, 12, 14, 15, 24$$

We need to add all of these values.

$$5 + 8 + 12 + 12 + 14 + 15 + 24 = 90$$

There are 7 values in this set of data

To get the mean or average you now must divide 90 by 7.

$$90 \div 7 = 12.86$$

The mean or average is 12.86

Find the mean, median and mode for the given sets of data below.

1) 5, 5, 8, 6, 13

2) 1, 3, 45, 26, 15, 20

3) 2, 5, 6, 9, 4, 6

4) 6, 7 , 23, 12, 18,18

Answers on page 75

Chapter 9: Real Numbers

Number Basics and Types

There are different kinds of numbers. The first kind of number is the first kind you learned when you were in preschool or kindergarten. These numbers are called "natural" numbers:

$$1, 2, 3, 4, 5, 6, \ldots$$

The next type is the "whole" numbers, which are the natural numbers but, they now include zero. So natural numbers and whole numbers are the same except whole numbers include the number zero.

$$0, 1, 2, 3, 4, 5, 6, \ldots$$

The next type of number is called "integers", which are zero, the natural numbers, and the negatives of the natural numbers:

$$\ldots, -6, -5, -4, -3, -2, -1, 0, 1, 2, 3, 4, 5, 6, \ldots$$

Next are "rational" numbers, or fractional numbers, which are ratios or the division of integers. When one integer is divided by another integer and the number is a terminating decimal like 0.5 or .275, this is also considered a rational number.

When an integer is divided by another integer and the number is a repeating decimal like 0.33333333, this is also considered a rational number However, if an integer is divided by another integer and the number is non-terminating decimals, or a non-repeating decimal, this is known as an irrational number.

Rational and irrational numbers are both called real numbers. Imaginary numbers are numbers with an "i" in them, like 5i. Numbers with an "I" next to them are not real numbers.

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Adding Real Numbers

When you add positive real numbers together, the sum will also be positive. When you are adding all negative numbers, the answer will be negative.

$$5 + 3 = 8$$

$$-5 + -3 = -8$$

When a number is written, we automatically assume that it is positive unless otherwise stated with a negative sign indicating the number is negative.

When adding positive and negative numbers, you subtract the numbers but, the number that was the biggest is the sign you place next for the sum.

$$-5 + 3 = -2$$

$$5 + -3 = 2$$

Add the real numbers and give the correct sum.

1) $7 + 1$ 2) $-6 + -2$ 3) $8 + -5$ 4) $4 + -1$

5) $1 + -1$ 6) $1 + 3$ 7) $-1 + -4$ 8) $5 + -6$

Answers on page 75

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Subtracting Real Number

When you are subtracting real numbers, you can think about it like a bank account. Let's look at the problem below.

$$-3 - 4$$

I have -3 dollars in the bank, and I take out another 4 dollars. Now, I am 7 dollars in the hole.

$$-3 - 4 = -7$$

Let's try another one.

$$5 - -4$$

When you have the negative sign and the subtraction sign next to each other, they cancel each other out and they both turn into positive numbers.

$$5 - -4$$

↓

$$5 + 4$$

Subtract the real numbers.

1) 7 - 1	2) -6 - -2	3) 8 - -5	4) 4 - -1
5) 1 - -1	6)1 - 3	7)-1 - -4	8)5- -6

Answers on page 75-76

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When you multiply and divide real numbers, first, you ignore the positive and negative signs and you work the problems out as if all the numbers are positive or simple numbers. You determine rather your answer will be positive or negative based on these rules:

Negative x negative = positive answer
Positive x positive = positive answer
Negative x positive = negative answer

Only when the signs are different is when the answer is negative. The same rule applies to dividing real numbers.

Negative ÷ negative = positive answer
Positive ÷ positive = positive answer
Negative ÷ positive = negative answer
Positive ÷ negative = negative answer

Let's look at some examples

$7 \times 2 = 14$	$-7 \times 2 = -14$
$7 \times -2 = -14$	$-7 \times -2 = 14$
$16 \div 8 = 2$	$-16 \div 8 = -2$
$16 \div -8 = -2$	$-16 \div -8 = 2$

Complete the problems below.

1) $7 \div -1$ 2) -6×-2 3) $40 \div -5$ 4) 4×-1

5) 1×-1 6) $12 \div 3$ 7) $-10 \div -5$ 8) 5×-6

Answers on page 76

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Variables

A variable is letter that stands in place of a number. Most of the time you have to solve an equation and figure out what the number is that the letter is standing in place for. Can you image if we used another number to take the place of a different number how confusing that would be? This is why we use variables, or letters that stand in place of a number in mathematics until we solve and equation.

What number does the variable represent?

1) $7 + a = 13$ 2) $n - 2 = 20$ 3) $40 \div b = -8$ 4) $(t)(-1) = 12$

Answers on page 76

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Expressions and Equations

An expression a number sentence without the equal sign

An equation is a number sentence with the equal sign that says that two things are equal. An equation always has an equal (=) sign. The thing or things that are on the left side of the equal sign are equal to the things on the right side of the equal sign.

Tell rather the problems below are an expression or an equation. If its and equation, solve the equation.

1) $9 + 10$	2) $14 - 7 = a + 3$	3) $5 \bullet 5 + 3$
4) $(3x)(\ -6) = 0$	5) $6 \div 3$	6) $18 + 6$

Answers on page 76

Appendix A: Answer Key

Base 10 and Number System

1. Ten thousand
2. Ten thousand
3. Ones
4. Hundred
5. Thousand
6. Hundred million
7. Millions
8. Ten million
9. Hundred thousand
10. Tens
11. 30,000
12. 70,000
13. 8
14. 500
15. 2,000
16. 700,000,000
17. 5,000,000
18. 30,000,000
19. 1,000,000
20. 90

Adding Whole Numbers
From page 7

1. 82
2. 75
3. 99
4. 97
5. 69
6. 75
7. 570
8. 1450
9. 503
10. 3677
11. 1,750,862
12. 18
13. 34
14. 126
15. 18 m
16. 12 minutes

Subtracting Whole Numbers
From page 9

1. 55
2. 9
3. 9
4. 8
5. 4
6. 37
7. 194
8. 116
9. 87
10. 290
11. 3877
12. 1699
13. 504
14. 1609

15. 760
16. 56
17. 300 children ,6000
18. 3
19. 66
20. 15

Multiplying Whole Numbers
From page 11

1. 3
2. 27
3. 72
4. 30
5. 225
6. 112
7. 1496
8. 1406
9. 918
10. 2980
11. 16,605
12. 27,324
13. 167,535
14. 137,826
15. 47,940
16. 407,490
17. $210
18. 26.25 feet
19. 1350
20. 12

Dividing Whole Numbers
From page 13

1. 3
2. 9
3. 27
4. 5
5. 5
6. 40
7. 12.5
8. 50
9. 17.06
10. 0
11. 4
12. 2 minutes per question

Order of Operation
From page 15

1. 89
2. -7
3. 18
4. 28
5. 14
6. 18

Factors and Fractions
From page 16

1. 1,3,5,15
2. 1,2,4,5,8,10,20,40
3. 1,3,4,6,9,12,36

4. 1,3,9
5. 1,2,3,4,6,8,12,24
6. 1,2,3,4,6,12
7. 1,2,5,10
8. 1,2,3,6,9,18

Fraction Basics
From page 18

	Numerators	Denominators
1.	3	4
2.	2	5
3.	6	8
4.	1	12
5.	4	9
6.	8	10
7.	11	13
8.	6	9
9.	14	32
10.	1	3

Proper, Improper Fractions and Mixed Numbers
From page 20

1. Improper
2. Mixed Number
3. Proper Fractions
4. Proper Fractions
5. Improper Fractions
6. Mixed Numbers
7. Improper Fractions
8. Mixed Numbers

Changing Improper Fractions to Mixed Numbers
From page 22

1. $\mathbf{1\frac{2}{3}}$
2. $\mathbf{1\frac{4}{5}}$
3. $\mathbf{5}$
4. $\mathbf{1\frac{3}{4}}$
5. $\mathbf{1\frac{1}{2}}$
6. 3
7. 3
8. $\mathbf{1\frac{1}{5}}$
9. $\mathbf{1\frac{2}{9}}$
10. 2

Changing Mixed Numbers to Improper Fractions
From page 23

1. $\frac{11}{3}$
2. $\frac{34}{7}$
3. $\frac{5}{3}$
4. $\frac{49}{9}$
5. $\frac{17}{8}$
6. $\frac{47}{4}$
7. $\frac{65}{6}$
8. $\frac{50}{8}$
9. $\frac{132}{15}$
10. $\frac{119}{8}$

Reducing Fractions
From page 24

1. $\frac{1}{4}$
2. $\frac{1}{2}$
3. 3
4. $\frac{1}{3}$
5. $\frac{1}{4}$
6. $\frac{2}{3}$
7. $\frac{9}{10}$
8. $\frac{1}{2}$
9. $\frac{1}{3}$
10. $\frac{3}{5}$

Multiplying Proper Fractions
From page 25
1. $\frac{3}{8}$
2. $\frac{1}{3}$
3. $\frac{4}{9}$
4. $\frac{5}{16}$

Dividing Proper Fractions
From page 26
1. $\frac{2}{3}$
2. $\frac{3}{4}$
3. $\frac{48}{48} = 1$
4. $\frac{9}{5}$

Changing Fractions to Decimals
From page 27
1. 0.50
2. 0.75
3. 0.0833
4. 0.375
5. 0.50

Changing Fractions to Percent
From page 27
1. 50%
2. 75%
3. 8.33%
4. 37.5%
5. 50%

LCM, LCD
From page 29 and 30
1. 24
2. 18
3. 15
4. 60
5. 6
6. 16
7. 20
8. 24

Add and Subtract Proper Fractions with Like Denominators
From page 31
1. $\frac{1}{6}$
2. $\frac{1}{3}$
3. $\frac{7}{10}$

4. $\frac{7}{7} = 1$

5. $\frac{4}{5}$

6. 0

7. $\frac{1}{7}$

8. $\frac{7}{9}$

Adding and Subtracting Unlike Fractions
From page 34

1. $\frac{7}{12}$

2. $\frac{1}{6}$

3. $1\frac{2}{5}$

4. $\frac{17}{21}$

5. $\frac{16}{25}$

6. $\frac{3}{8}$

7. $\frac{13}{27}$

8. $\frac{13}{36}$

Multiplying Mixed Fractions
From page 36

1. $2\frac{3}{8}$

2. $19\frac{1}{2}$

3. $8\frac{3}{4}$

4. 6

5. $5\frac{1}{7}$

6. 7

7. $1\frac{2}{3}$

8. $26\frac{5}{14}$

9. $7\frac{25}{48}$

10. $38\frac{1}{9}$

Dividing Proper and Mixed Fractions
From page 38

1. 1
2. $1\frac{8}{13}$
3. $1\frac{2}{3}$
4. $3\frac{1}{3}$
5. $\frac{6}{32}$
6. $3\frac{19}{27}$
7. $1\frac{7}{9}$
8. $11\frac{1}{2}$
9. 15
10. $2\frac{3}{10}$

Adding and Subtracting Mixed Numbers with Like Denominators
From page 39

1. 6
2. $1\frac{1}{4}$
3. 8
4. $3\frac{5}{9}$
5. $2\frac{2}{3}$
6. $3\frac{2}{3}$

Adding and Subtracting Mixed Numbers with Unlike Denominators
From page 40

1. $5\frac{1}{4}$
2. $4\frac{1}{6}$
3. $5\frac{7}{12}$
4. $4\frac{11}{24}$
5. $5\frac{1}{4}$

Subtracting Mixed Numbers with Borrowing
From page 42

1. $1\frac{3}{4}$
2. $\frac{2}{3}$
3. $5\frac{1}{6}$
4. $3\frac{5}{12}$
5. $1\frac{9}{20}$

Ratios
From page 43

1. 4:1, 4 to 1, $\frac{4}{1}$
2. 1:70, 1 to 70, $\frac{1}{70}$
3. 1:30, 1 to 30, $\frac{1}{30}$
4. 80:1, 80 to 1, $\frac{80}{1}$
5. 17:3, 17 to 3, $\frac{17}{3}$

Proportions
From page 45

1. 18
2. 2
3. 10
4. 12

Proportions Continued
From page 46

1. 5
2. 2
3. 3
4. 4

Rates
From page 48

1. 10 hours
2. 200 km
3. 720 people
4. 21.14 miles/gallon
5. 15 sheets

Percent
From page 50

1. $\frac{1}{4}$
2. $\frac{1}{2}$
3. $\frac{3}{100}$

4. $1\frac{1}{4}$
5. $\frac{1}{10}$

Translating Percent Problems
From page 53

1. 19.2
2. 30.38
3. 7.74
4. 10%
5. 3.9% or 4%
6. 10%

Customary Measurements
From page 54
1. 8
2. 600
3. 512
4. 4 hours 47 Minutes
5. The second bottle

Global Metric
From page 56

6. 0.99
7. 1000
8. 0.65
9. 500
10. 1,200

Statistics
From page 60

1.	Mean = 7.4	Median = 6	Mode = 5
2.	Mean = 18.3	Median = 17.5	Mode = Non-modal
3.	Mean = 5.3	Median = 5.5	Mode = 6
4.	Mean = 14	Median = 15	Mode = 18

Adding Real Numbers
From page 62
1. 8
2. -8
3. 3
4. 3
5. 0
6. 4
7. -5
8. -1

Subtracting Real Numbers
From page 63
1. 6
2. -4
3. 13
4. 5
5. 2
6. -2
7. 3

8. 11

Multiplying and Dividing Real Numbers
From page 64

1. -7
2. 12
3. -8
4. -4
5. -1
6. 4
7. 2
8. -30

Variables
From page 65

1. 6
2. 22
3. -5
4. -12

Expressions and Equations
From page 66

1. Expression
2. A = 4
3. Expression
4. x = 2
5. Expression
6. Expression

Appendix B: Charts, Measurements Equivalencies and Resources

Measurement Equivalencies

1 gram (g) = 1000 milligrams (mg)
1 kilogram (kg) = 1000 grams (g)
1 microgram (mcg) = .001 milligram (mg)
1 milligram = 1000 microgram (mcg)
1 liter (L) = 1000 milliliters (ml)
1 milliliter (ml) = 1 cubic centimeter (cc)
1 meter = 100 centimeters (cm)
1 meter = 1000 millimeters (mm)
1 cubic centimeter (cc) = 1 milliliter (ml)
1 teaspoon = 5 cubic centimeter (cc) = 5 milliliters (ml)
1 tablespoon = 15 cubic centimeter (cc) = 15 milliliters (ml)
1 tablespoon = 3 teaspoon
1 ounce = 30 cc = 30 ml = 2 tablespoons = 6 teaspoons
8 ounces = 240 cc = 240 ml = 1 cup
1 milliliter (ml) = 15 minims (M) = 15 drops (gtt)
5 milliliters (ml) = 1 fluidram = 1 teaspoon
15 milliliters (ml) = 4 fluidrams = 1 tablespoon
30 milliliters (ml) = 1 ounce (oz.) = 2 tablespoons
500 milliliters (ml) = 1 pint (pt.)
1000 milliliters (ml) = 1 quart (qt.)

1 kilograms = 2.2 pound (lbs.)
1 gram (g) = 1000 milligrams = 15 grains (gr)

2.5 centimeters = 1 inch

Celsius (C) = (F - 32) × 5/9
Fahrenheit (F) = (C × 9/5) + 32

1 gram (g) protein = 4 calories
1 gram (g) fat = 9 calories

The United States customary system units

Time	Length	Capacity and Weight	
60 seconds = 1 minute	12 inches = 1 foot	2 tablespoons = 1 fluid ounce	2,000 pounds = 1 ton
60 minutes = 1 hour	36 inches = 1 yard	8 fluid ounces = 1 cup	4 cups = 1 quart
24 hours = 1 day	3 feet = 1 yard	2 cups = 1 pint	16 cups = 1 gallon
7 days = 1 week	5,280 feet = 1 mile	2 pints = 1 quart	8 pints = 1 gallon
12 months = 1 year	1,760 yards = 1 mile	2 quarts = ½ gallon	
52 weeks = 1 year		4 quarts = 1 gallon	
100 years = 1 century		16 ounces = 1 pound	

Common Pharmacologic Abbreviations

Drug and Solution Measurements
Drug Dosage Forms

cap	capsule
DS	double strength
EC	enteric coated
Elix	elixir
Liq	liquid
Sol	solution
Supp	suppository
Susp	suspension
Syr	syrup
Tab	tablet
Ung, oit	ointment

Routes of Drug Administration

AS	left ear
AD	right ear
AU	each ear
IM	intramuscular
IV	intravenous
IVPB	intravenous piggyback
V, PV	vaginally
OS	left eye
OD	right eye
OU	each eye
PO	by mouth
R, PR	by rectum
R	right
L	left
SC, SQ	subcutaneous
S&S	swish & swallow

Times of Drug Administration

ac	before meals
ad lib	as desired
Bid	twice a day
HS	at bedtime
pc	after meals
Prn	as needed
Q am, QM	every morning
QD, qd	every day
Qh	every hour
Q2h	every 2 hours
Q3h	every 3 hours, and so on
Qid	four times a day
Qod	every other day
STAT	immediately
Tid	three times a day

Intravenous Fluids

D5W – 5% Dextrose in water
D5NS – 5% Dextrose in normal saline
D5 ½NS – 5% Dextrose in ½ normal saline
L.R. – Lactated Ringers
Remember 1 liter = 1000 ml

Miscellaneous

AMA	against medical advice
ASA	aspirin
ASAP	as soon as possible
BS	blood sugar (glucose)
c	with
C/O	complains of
D/C	discontinue
DX	diagnosis
HX	history
KVO	keep vein open
MR	may repeat
NKA	no known allergies
NKDA	no known drug allergies
NPO	nothing by mouth
R/O	rule out
R/T	related to
Rx	treatment, prescription
s	without
S/S	signs/symptoms
Sx	symptoms
TO	telephone order
VO	verbal order
~	approximately equal to
>	greater than
<	less than
8	increase
9	decrease

Multiplication Chart

1 x 0 = 0 1 x 1 =1 1 x 2 = 2 1 x 3 = 3 1 x 4 = 4 1 x 5 = 5 1 x 6 = 6 1 x 7 = 7 1 x 8 = 8 1 x 9 = 9 1 x 10 =10 1 x 11 =11 1 x 12 =12	2 x 0 = 0 2 x 1 = 2 2 x 2 = 4 2 x 3 = 6 2 x 4 = 8 2 x 5 = 10 2 x 6 = 12 2 x 7 = 14 2 x 8 = 16 2 x 9 = 18 2 x 10 = 20 2 x 11 = 22 2 x 12 = 24	3 x 0 = 0 3 x 1 = 3 3 x 2 = 6 3 x 3 = 9 3 x 4 =12 3 x 5 =15 3 x 6 =18 3 x 7 =21 3 x 8 =24 3 x 9 =27 3 x 10 = 30 3 x 11 = 33 3 x 12 = 36	4 x 0 = 0 4 x 1 = 4 4 x 2 = 8 4 x 3 = 12 4 x 4 = 16 4 x 5 = 20 4 x 6 = 24 4 x 7 = 28 4 x 8 = 32 4 x 9 = 36 4 x 10 = 40 4 x 11 = 44 4 x 12 = 48
5 x 0 = 0 5 x 1 = 5 5 x 2 = 10 5 x 3 = 15 5 x 4 = 20 5 x 5 = 25 5 x 6 = 30 5 x 7 = 35 5 x 8 = 40 5 x 9 = 45 5 x 10 = 50 5 x 11 = 55 5 x 12 = 60	6 x 0 = 1 6 x 1 = 6 6 x 2 = 12 6 x 3 = 18 6 x 4 = 24 6 x 5 = 30 6 x 6 = 36 6 x 7 = 42 6 x 8 = 48 6 x 9 = 54 6 x 10 =60 6 x 11 = 66 6 x 12 = 72	7 x 0 = 0 7 x 1 = 7 7 x 2 = 14 7 x 3 = 21 7 x 4 = 28 7 x 5 = 35 7 x 6 = 42 7 x 7 = 49 7 x 8 = 56 7 x 9 = 63 7 x 10 =70 7 x 11 = 77 7 x 12 = 84	8 x 0 = 0 8 x 1 = 8 8 x 2 = 16 8 x 3 = 24 8 x 4 = 32 8 x 5 = 40 8 x 6 = 48 8 x 7 = 56 8 x 8 = 64 8 x 9 = 72 8 x 10 =80 8 x 11 = 88 8 x 12 = 96
9 x 0 = 0 9 x 1 = 9 9 x 2 = 18 9 x 3 = 27 9 x 4 = 36 9 x 5 = 45 9 x 6 = 54 9 x 7 = 63 9 x 8 = 72 9 x 9 = 81 9 x 10 =90 9 x 11 = 99 9 x 12 = 108	10 x 0 = 0 10x 1 =10 10 x 2 = 20 10 x 3 = 30 10 x 4 = 40 10 x 5 = 50 10x 6 = 60 10 x 7 = 70 10 x 8 = 80 10 x 9 = 90 10 x 10 =100 10 x 11 = 110 10 x 12 = 120	11 x 0 = 0 11x 1 =11 11 x 2 = 22 11 x 3 = 33 11 x 4 = 44 11 x 5 = 55 11 x 6 = 66 11 x 7 = 77 11 x 8 = 88 11 x 9 = 99 11 x 10 =110 11 x 11 = 121 11 x 12 = 132	12 x 0 = 0 12 x 1 =12 12 x 2 = 24 12 x 3 = 36 12 x 4 = 48 12 x 5 = 60 12 x 6 = 72 12 x 7 = 84 12 x 8 = 96 12 x 9 = 108 12 x 10 =120 12 x 11 = 132 12 x 12 = 144

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