

# **BOSTON REED**

## **Clinical Medical Assistant Program Math Review Handout**

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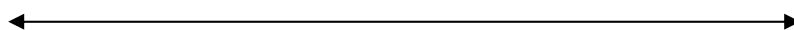
## Addition of 3 Numbers

$$\begin{array}{r} 33 \\ 8 \\ + 14 \\ \hline 55 \end{array}$$

$$\begin{array}{r} 33 \\ 8 \\ + 14 \\ \hline 55 \end{array}$$

1. Add the numbers in the ones column.  
Add the first two numbers  $3 + 8 = 11$ .  
Add the third number.  $11 + 4 = 15$

2. Add the numbers in the tens column.  
Don't forget the 1 carried over from the ones column.  $1 + 3 = 4$ . Add the third number,  $4 + 1 = 5$ .



1. 
$$\begin{array}{r} 32 \\ 7 \\ + 20 \\ \hline \end{array}$$
 
$$\begin{array}{r} 18 \\ 1 \\ + 36 \\ \hline \end{array}$$
 
$$\begin{array}{r} 21 \\ 0 \\ + 3 \\ \hline \end{array}$$
 
$$\begin{array}{r} 76 \\ 2 \\ + 11 \\ \hline \end{array}$$
 
$$\begin{array}{r} 2 \\ 18 \\ + 5 \\ \hline \end{array}$$

2. 
$$\begin{array}{r} 51 \\ 5 \\ + 2 \\ \hline \end{array}$$
 
$$\begin{array}{r} 8 \\ 27 \\ + 9 \\ \hline \end{array}$$
 
$$\begin{array}{r} 32 \\ 22 \\ + 5 \\ \hline \end{array}$$
 
$$\begin{array}{r} 56 \\ 33 \\ + 10 \\ \hline \end{array}$$
 
$$\begin{array}{r} 35 \\ 42 \\ + 5 \\ \hline \end{array}$$

3. 
$$\begin{array}{r} 3 \\ 21 \\ + 5 \\ \hline \end{array}$$
 
$$\begin{array}{r} 25 \\ 46 \\ + 14 \\ \hline \end{array}$$
 
$$\begin{array}{r} 6 \\ 2 \\ + 54 \\ \hline \end{array}$$
 
$$\begin{array}{r} 62 \\ 33 \\ + 5 \\ \hline \end{array}$$
 
$$\begin{array}{r} 83 \\ 5 \\ + 20 \\ \hline \end{array}$$

## Subtracting Three-Digit Numbers

	Hundreds			
		Tens		Ones
6	1	8		
- 2	0	9		
9				

	Hundreds			
		Tens		Ones
6	1	8		
- 2	0	9		
0 9				

	Hundreds			
		Tens		Ones
6	1	8		
- 2	0	9		
4 0 9				

1. Subtract the numbers in the ones column. 8-9 cannot be done. Rename "8" to "18" by borrowing from the 1 in the tens column.

2. Subtract the numbers in the tens column, remember the 1 is gone. 0 - 0 = 0

3. Subtract the numbers in the hundreds column. 6 - 2 = 4

1.	148 <u>-36</u>	174 <u>-43</u>	242 <u>-33</u>	255 <u>-48</u>
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2.	353 <u>-205</u>	326 <u>-250</u>	870 <u>-328</u>	258 <u>-146</u>
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3.	694 <u>-589</u>	786 <u>-579</u>	971 <u>-26</u>	777 <u>-456</u>
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4.	219 <u>-14</u>	493 <u>-188</u>	800 <u>-250</u>	550 <u>-315</u>
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## Multiplying Three-Digit Numbers by One Digit

$$\begin{array}{r} 128 \\ \times 4 \\ \hline 2 \end{array}$$

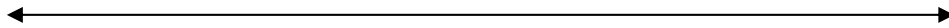
$$\begin{array}{r} 128 \\ \times 4 \\ \hline 12 \end{array}$$

$$\begin{array}{r} 128 \\ \times 4 \\ \hline 512 \end{array}$$

1. Multiply the number in the ones column by 4.  $4 \times 8 = 32$ . Carry the 3 over to the tens column

2. Multiply the number in the tens column by 4.  $4 \times 2 = 8 + 3 = 11$  tens. Carry the one to the hundreds column.

3. Multiply the number in the hundreds column by 4.  $4 \times 1 + 1 = 5$



**Multiply to find the product in each problem.**

$$\begin{array}{r} 318 \\ \times 3 \\ \hline \end{array}$$

$$\begin{array}{r} 164 \\ \times 5 \\ \hline \end{array}$$

$$\begin{array}{r} 408 \\ \times 6 \\ \hline \end{array}$$

$$\begin{array}{r} 237 \\ \times 8 \\ \hline \end{array}$$

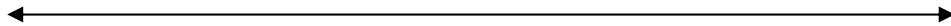
$$\begin{array}{r} 128 \\ \times 2 \\ \hline \end{array}$$

$$\begin{array}{r} 333 \\ \times 7 \\ \hline \end{array}$$

$$\begin{array}{r} 350 \\ \times 2 \\ \hline \end{array}$$

$$\begin{array}{r} 508 \\ \times 4 \\ \hline \end{array}$$

$$\begin{array}{r} 143 \\ \times 6 \\ \hline \end{array}$$





## MATH REVIEW FOR DECIMALS

### Additional Rules for Multiplication of Decimals

- § Multiply the numbers together first.
- § Then to find the correct decimal placement for your answer, count the numbers after the decimal point from left to right in the problem.
- § The decimals do not need to be lined up for multiplication.

**Counting L R from the decimal point**  
 15.52 = 2 places  
 22.1 = 1 place  
**Total of 3 places**

*Example*

$$\begin{array}{r}
 \downarrow \\
 15.52 \\
 \times 22.1 \\
 \hline
 1552 \\
 3104 \\
 3104 \\
 \hline
 342.992 \\
 \uparrow
 \end{array}$$

*When you have the answer count **R L** the same number of places to find where the decimal belongs*

### Additional Rules for Division of Decimals:

- § Remember that if you see “ $13.75 \div 2.2 =$ ” you would say it like “13.75 divided by 2.2 (**not** divided into).”
- § The number after the  $\div$  (“divided by”) would go on the outside of the division box.
- § If a decimal is present in the number on the outside of the box, you must move it all the way to the right. Count the number of places as you move it.
- § Then move the decimal for the number inside the box. Move it to the right the exact number of places as you did with the first number.
- § The decimal for the answer goes directly above the decimal inside the box.

Write the problem like this  
 Move the decimal points.  
 Do the math (Divide).

$$2.2 \overline{) 13.75}$$

**Step Two:** Then move the decimal point inside the box the same number of spaces from L R. **1 space** so 13.75 becomes 137.5

**Step One:** First move the decimal in the number on the outside of the box from L R. How many spaces or numbers did we move the decimal here?  
 2.2 = **1 space**

$$\begin{array}{r}
 6.25 \\
 22 \overline{) 137.50} \\
 \underline{-132} \phantom{0} \\
 55 \\
 \underline{-44} \phantom{0} \\
 110 \\
 \underline{-110} \\
 0
 \end{array}$$

**Step Three:** The decimal point in the answer is immediately above the decimal point in the box.

## Decimals Practice Sheet

*Complete each math problem and then correct each question as you go along.*

**Tip#1:** *By correcting each problem as you complete it, you will reinforce good math habits and immediately discover problem areas rather than repeating any habitual error with other problems.*

**Tip#2:** *If you have problems keeping your columns in line or in lining up your decimals, use graph paper to do your addition, subtraction, and division.*

1. \_\_\_\_\_  $0.259 + 23.005 =$

2. \_\_\_\_\_  $2.68 + 5.954 =$

3. \_\_\_\_\_  $1.927 + 0.089 + 26 + 0.434 =$

4. \_\_\_\_\_  $8.74 - 2.99 =$

5. \_\_\_\_\_  $3.23 - 0.045 =$

6. \_\_\_\_\_  $267.79 - 251.009 =$

7. \_\_\_\_\_  $3.12 \times 7.6 =$

8. \_\_\_\_\_  $8.06 \times 9.3 =$

9. \_\_\_\_\_  $9.57 \times 0.06 =$

10. \_\_\_\_\_  $4.3 \times 0.6 =$

11. \_\_\_\_\_  $5.25 \div 1.2 =$

12. \_\_\_\_\_  $7.6 \div 0.08 =$

13. \_\_\_\_\_  $4.305 \div 2.87 =$

14. \_\_\_\_\_  $0.72 \div 0.125 =$

15. \_\_\_\_\_  $35.36 \div 5.2 =$

## Instruction for Fractions

<b>Whole number</b> ↓ is the “2”	2	↑ <b>Numerator</b> is the “1”
		1 <b>Denominator</b> is the “3”

<b>Common Terms</b>																									
<b>Mixed Fraction:</b>	A number that has a whole number and a fraction																								
<b>Improper Fraction:</b>	A fraction that has a numerator larger than the denominator																								
<b>Removing The Whole Number From A Mixed Fraction:</b>	<p><b>FORMULA:</b> <math>W\# \Delta D + N = \text{New N}</math></p> <hr/> <p><b>Example:</b></p> <div style="display: flex; justify-content: space-between; align-items: flex-start;"> <div style="text-align: center;"> <math>2\frac{1}{3} =</math>  <i>Whole number (W#) = 2</i>  <i>Numerator (N) = 1</i>  <i>Denominator (D) = 3</i> </div> <div style="text-align: center;"> <math>2\frac{1}{3} = W\# \frac{N}{D}</math> </div> </div> <table style="margin-left: auto; margin-right: auto; border-collapse: collapse;"> <tr> <td style="padding: 5px;"><math>2\frac{1}{3} =</math></td> <td style="border: 1px solid black; padding: 5px; text-align: center;">Formula</td> <td style="border: 1px solid black; padding: 5px; text-align: center;">W#</td> <td style="border: 1px solid black; padding: 5px; text-align: center;">Δ</td> <td style="border: 1px solid black; padding: 5px; text-align: center;">D</td> <td style="border: 1px solid black; padding: 5px; text-align: center;">+</td> <td style="border: 1px solid black; padding: 5px; text-align: center;">N</td> <td style="border: 1px solid black; padding: 5px; text-align: center;">=</td> <td style="border: 1px solid black; padding: 5px; text-align: center;">New N</td> </tr> <tr> <td></td> <td style="border: 1px solid black; padding: 5px; text-align: center;">Working the Problem</td> <td style="border: 1px solid black; padding: 5px; text-align: center;">2</td> <td style="border: 1px solid black; padding: 5px; text-align: center;">Δ</td> <td style="border: 1px solid black; padding: 5px; text-align: center;">3</td> <td style="border: 1px solid black; padding: 5px; text-align: center;">+</td> <td style="border: 1px solid black; padding: 5px; text-align: center;">1</td> <td style="border: 1px solid black; padding: 5px; text-align: center;">=</td> <td style="border: 1px solid black; padding: 5px; text-align: center;">7</td> </tr> </table> <p style="margin-left: 20px;"><u>Final answer is:</u></p> <div style="text-align: center; margin-left: 100px;"> <table style="border-collapse: collapse;"> <tr> <td style="border-bottom: 1px solid black; padding: 5px;">New Numerator</td> <td style="padding: 0 10px;">=</td> <td style="border: 1px solid black; padding: 5px; text-align: center;">7</td> </tr> <tr> <td style="padding: 5px;">Old Denominator</td> <td></td> <td style="border: 1px solid black; padding: 5px; text-align: center;">3</td> </tr> </table> </div>	$2\frac{1}{3} =$	Formula	W#	Δ	D	+	N	=	New N		Working the Problem	2	Δ	3	+	1	=	7	New Numerator	=	7	Old Denominator		3
$2\frac{1}{3} =$	Formula	W#	Δ	D	+	N	=	New N																	
	Working the Problem	2	Δ	3	+	1	=	7																	
New Numerator	=	7																							
Old Denominator		3																							
	<p><b>Explanation:</b> <i>When you have a fraction that has a whole number, “get rid” of the whole number prior to actually working the <u>problem</u> (Follow steps below).</i></p> <p><b>Steps:</b></p> <ol style="list-style-type: none"> <li>1. Multiply the whole number (W#) by the denominator (D)</li> <li>2. Then add the numerator (N).</li> <li>3. The answer for step 2 is the <b>New N</b> (top number in your fraction).</li> <li>4. Place the <b>old denominator</b> (bottom number) under the <b>new N</b> as shown in the example above.</li> <li>5. Now do the math (addition, subtraction, multiplication or division).</li> </ol>																								

<p><b>How To Find The Lowest Common Denominator (LCD)</b></p>	<p><b>Rule:</b> <i>When adding or subtracting with fractions you must have the same denominator for each fraction before adding/subtracting.</i></p> <p style="text-align: center;">*** **</p> <p>To find the number that will become the new denominator you should ask “what is the lowest number that all denominators divide into evenly?”</p> <p><b>Example:</b></p> $\frac{1}{4} + \frac{3}{5}$ <p>What is the <u>lowest number</u> that both 4 and 5 go into equally? (answer-20)</p>
<p><b>EXAMPLE OF FINDING THE LOWEST COMMON DENOMINATOR</b></p> <p style="text-align: center;">↓</p> <p><i>(Shown vertically, but may be done horizontally)</i></p> <p><b>Solving the same ↓ problem</b></p> <p><i>(Shown horizontally, but may be done vertically)</i></p>	<p><b><u>What number do both 4 and 5 go into evenly? Answer: 20</u></b></p> <p><i>What number do we have to multiply 5 by to get 20? Answer: 4</i></p> <p><i>What number do we have to multiply 4 by to get 20? Answer: 5</i></p> $\frac{1}{4} \Delta \frac{5}{5} = \frac{5}{20}$ $\frac{3}{5} \Delta \frac{4}{4} = \frac{12}{20}$ $\frac{5}{20} + \frac{12}{20} = \frac{17}{20}$ <p><b>Rule:</b> <i>When multiplying the denominator by a number to find a common denominator, you <u>must</u> also multiply the numerator by that <u>same number</u> so that the value of the fraction does not change</i></p> <p>* Dashed boxes around fraction indicate the number is from the original problem</p>

<p><b>Making A Mixed Fraction From An Improper Fraction:</b></p>	<p><b>Example #1:</b>          You will want to take the top number (N) and divide it by the bottom number (D). Do not add a decimal! Use your “remainder” to become the new numerator.</p> <p>If your answer is: <math>\frac{28}{3}</math></p> <p>Divide like this:</p> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; padding: 5px; margin-right: 10px;">           Same bottom number Denominator- “3”         </div> <div style="text-align: center;"> <math display="block">\begin{array}{r} 9 \\ 3 \overline{) 28} \\ \underline{-27} \\ 1 \end{array}</math> </div> <div style="border: 1px solid black; padding: 5px; margin-left: 10px;">           ↑ New whole number - “9”         </div> </div> <div style="margin-top: 10px;"> <div style="border: 1px solid black; padding: 5px; display: inline-block;">             New top number- Numerator- “1”           </div> </div> <p>You would write your final answer like this:</p> <div style="display: flex; align-items: center; justify-content: center;"> <math>\frac{28}{3} = 9 \frac{1}{3}</math> <div style="border: 1px solid black; padding: 5px; margin-left: 10px;"> <math>9 \frac{1}{3}</math> </div> </div>
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<p><b>Finding The Common Factor So That You Can Reduce To Lowest Terms :</b></p>	<p><b>Steps:</b></p> <ol style="list-style-type: none"> <li>1. Factor both the N and the D.</li> <li>2. Find the common factor, the one that both numbers can be divided by.</li> <li>3. Divide each number by the factor.</li> <li>4. Check answer to see if it can be factored out further. Are there no other common factors left?</li> </ol> <p><b>Example:</b></p> <p>If you have an answer of: <math>\frac{5}{25}</math></p> <p>Find the common factor. Divide each number by the same factor chosen.</p> <p>The factors of 5 are 1, 5:          The factors of 25 are 1, 5, 25:</p> <div style="display: flex; align-items: center; justify-content: center; margin-top: 10px;"> <math>\frac{5 \div 5}{25 \div 5} = \frac{1}{5}</math> </div> <p>In this example the number 5 can be divided into both numbers. Divide each number by 5 and that will give you the answer in the lowest terms (reduced).</p>
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**ADDITION AND SUBTRACTION:**

**Rules:**

1. If you have a mixed fraction, change to an improper fraction
2. Find the Lowest Common Denominator.
3. Add the top numbers (N) to get a new N.
4. Keep the old bottom number (D).
5. Reduce to the lowest terms.

**Addition**

**Example of Addition:**

$$1 \frac{3}{4} + \frac{1}{3} = \text{---}$$

**Step 1**

**Get Rid Of The Whole Number ↓**

$$1 \frac{3}{4} = \begin{array}{|c|c|c|c|c|c|c|} \hline \text{W\#} & \Delta & \text{D} & + & \text{N} & = & \text{New N} \\ \hline 1 & \Delta & 4 & + & 3 & = & 7 \\ \hline \end{array}$$

\*New "improper" fraction:

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

\* Place New (N) numerator over the old (D) denominator to make your new fraction.

**Steps 2, 3 & 4**

**Find The Lowest Common Denominator**

Add numerators together

**What number do both 4 and 3 go into evenly? Answer: 12**  
*What number do we have to multiply 3 by to get 12? Answer: 4*  
*What number do we have to multiply 4 by to get 12? Answer: 3*

W#=1	D=4	N=3
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$$\frac{21}{12} = \frac{3}{3} \Delta \frac{7}{4} + \frac{1}{3} \Delta \frac{4}{4} = \frac{4}{12}$$

$$\frac{21}{12} + \frac{4}{12} = \frac{25}{12} = \text{---}$$

**Reduce To Lowest Terms**

$$12 \overline{) \begin{array}{r} 25 \\ -24 \\ \hline 1 \end{array}}$$

$$\frac{25}{12} = \boxed{2 \frac{1}{12}}$$

# Subtraction

<b>Example of Subtraction:</b>	<b>Example:</b> $1 \frac{3}{4} - \frac{1}{3} = \underline{\hspace{2cm}}$														
<b>Step 1:</b>  Follow the formula $f$  New fraction $f$	$1 \frac{3}{4} = $ <table border="1" style="display: inline-table; border-collapse: collapse; text-align: center;"> <tr> <td><b>W#</b></td> <td><b>Δ</b></td> <td><b>D</b></td> <td><b>+</b></td> <td><b>N</b></td> <td><b>=</b></td> <td><b>New N</b></td> </tr> <tr> <td>1</td> <td>Δ</td> <td>4</td> <td>+</td> <td>3</td> <td>=</td> <td>7</td> </tr> </table> <div style="border: 1px solid black; padding: 5px; display: inline-block; margin: 5px;">             *New “improper” fraction: <math>\frac{7}{4}</math> </div> <div style="border: 1px solid black; padding: 5px; display: inline-block; margin: 5px; margin-left: 20px;">             W#=1   D=4   N=3         </div>  <p>* Place New (N) numerator over the old (D) denominator to make your new fraction.</p>	<b>W#</b>	<b>Δ</b>	<b>D</b>	<b>+</b>	<b>N</b>	<b>=</b>	<b>New N</b>	1	Δ	4	+	3	=	7
<b>W#</b>	<b>Δ</b>	<b>D</b>	<b>+</b>	<b>N</b>	<b>=</b>	<b>New N</b>									
1	Δ	4	+	3	=	7									
<b>Steps 2, 3 &amp; 4</b>  <b>Find The Lowest Common Denominator</b>  Subtract 2 <sup>nd</sup> numerator from the 1 <sup>st</sup> numerator	<p><b><u>What number do both 4 and 3 go into equally? Answer: 12</u></b>  <i>What number do we have to multiply 3 by to get 12? <u>Answer: 4</u></i>  <i>What number do we have to multiply 4 by to get 12? <u>Answer: 3</u></i></p> $\frac{21}{12} = \frac{3}{3} \Delta \frac{7}{4} - \frac{1}{3} \Delta \frac{4}{4} = \frac{4}{12}$ $\frac{21}{12} - \frac{4}{12} = \frac{17}{12} = \underline{\hspace{2cm}}$														
<b>Reduce To Lowest Terms</b>	$12 \overline{) \begin{array}{r} 17 \\ -12 \\ \hline 5 \end{array}} \qquad \frac{17}{12} = \boxed{1 \frac{5}{12}}$														

# Multiplication

<b>MULTIPLICATION</b>	<p><b>Steps:</b></p> <ol style="list-style-type: none"> <li>1. <i>No common denominator is needed!</i></li> <li>2. If you have a mixed fraction change to an improper fraction</li> <li>3. Multiply the numerators straight across.</li> <li>4. Multiply the denominators straight across.</li> <li>5. Reduce to lowest terms.</li> </ol>
<p><b>Steps 1 &amp; 2:</b> N/A</p> <p><b>Steps 3 &amp; 4:</b></p>	<p><b>Example:</b></p> $\frac{3}{4} \Delta \frac{1}{3} = \frac{3}{12}$
<p><b>Step 5:</b></p> <p style="text-align: center;"><b>Reduce Fraction To Lowest Terms</b></p>	<p>The factors of 3 are 1 &amp; 3</p> <p>The factors of 12 are 1, 2, 3, 4, 6, &amp; 12</p> $\frac{3}{12} \div \frac{3}{3} = \frac{1}{4}$ <p><b>Rule:</b> Find the largest number that can divide evenly into both the numerator and the denominator. In this example the number 3 can be divided into both numbers. Divide each number by 3 and that will give you the answer in the lowest terms (reduced).</p>

# Division

<b>DIVISION</b>	<p><b>Steps:</b></p> <ol style="list-style-type: none"> <li>1. <i>No common denominator is needed!</i></li> <li>2. If you have a mixed fraction change to an improper fraction.</li> <li>3. Flip the second fraction so that it is reversed.</li> <li>4. Multiply the numerators straight across.</li> <li>5. Multiply the denominators straight across.</li> <li>6. Reduce to lowest terms.</li> </ol>
<p><b>Steps 1 &amp; 2:</b> N/A</p> <p><b>Step 3</b> Flip the 2<sup>nd</sup> fraction <i>f</i></p>	<p><b>Example:</b></p> $\frac{3}{4} \div \frac{1}{3} = \frac{3}{4} \Delta \frac{3}{1}$
<p><b>Step 4, 5 &amp; 6:</b></p> <p>Multiply &amp; Reduce to lowest terms</p>	$\frac{3}{4} \Delta \frac{3}{1} = \frac{9}{4} = \boxed{2 \frac{1}{4}}$

## **CALCULATOR INSTRUCTIONS WITH FRACTIONS:**

*\*Calculator must have an “a b/c” function key for this process.*

### **Example 1:**

Problem:  $5/6 \div 2/3 = 1 \frac{1}{4}$

Calculator process: 5  6  $\div$  2  3 = 1  $\frac{1}{4}$

### **Example 2:**

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

Calculator process: 3  3  4  $\div$  1  1  2 = 2  $\frac{1}{2}$

## FRACTIONS PRACTICE SHEET

**Complete each math problem and then correct each question as you go along. Give answers in lowest possible terms.**

*Tip#1: By correcting each problem as you complete it, you will reinforce good math habits and immediately discover problem areas rather than repeating any habitual error with other math problems.*

1. \_\_\_\_\_  $6/7 + 1/4 =$

2. \_\_\_\_\_  $5 \frac{3}{4} + 2/3 =$

3. \_\_\_\_\_  $1/2 + 3/4 =$

4. \_\_\_\_\_  $3 \frac{1}{10} + 2 \frac{5}{8} =$

5. \_\_\_\_\_  $7/11 - 1/3 =$

6. \_\_\_\_\_  $4 \frac{2}{5} - 1 \frac{3}{4} =$

7. \_\_\_\_\_  $1 \frac{4}{5} - 7/8 =$

8. \_\_\_\_\_  $5/6 - 1/3 =$

9. \_\_\_\_\_  $5/8 \times 2 \frac{1}{2} =$

10. \_\_\_\_\_  $1/2 \times 5/6 =$

11. \_\_\_\_\_  $11 \frac{2}{3} \times 5/8 =$

12. \_\_\_\_\_  $3 \frac{4}{5} \times 5 \frac{1}{3} =$

13. \_\_\_\_\_  $6/7 \div 1/3 =$

14. \_\_\_\_\_  $2 \frac{1}{3} \div 3/4 =$

15. \_\_\_\_\_  $3 \frac{5}{8} \div 1 \frac{1}{2} =$

16. \_\_\_\_\_  $5/6 \div 2/3 =$

**MATH: MAKING SENSE OF PERCENTS**

**Rule:** When you see the word “**Of**” it means to multiply

**Rule:** Always change the percentile into a decimal prior to working the formula by moving the decimal TWO PLACES to the left. (Example: 150% = 1.50; 8% = 0.08; or 98% = 0.98 – see hint below). As soon as the decimal is moved you should drop the % sign from the problem.

**Hint:** Percentages are like pennies.

If you write fifty cents in your checkbook where does the decimal point go?

Answer: \$ 0.50

If you change 50% into a decimal you would write it like fifty cents.

50% = 0.50 or 0.5

100% = 1.00 (like one dollar) or 1

5% = 0.05 (like a nickel)

**Hint:** Most people already know percentages, they just don’t realize it. If you have a leather jacket costing \$300.00 and it is 50% off, how much will the jacket cost?

Answer: \$150.00.

That same problem would be written like: 50% of 300 = 150 or 0.50 x 300 = 150

**Example Problem #1:** Find 25% of 200 =

Example Problem:	Find 25%	Of	200	=	?
Work the Problem:	25% = 0.25	X	200	=	<b>50</b>

Long hand example:

$$\begin{array}{r}
 200 \\
 \times 0.25 \\
 \hline
 1000 \\
 400 \\
 \hline
 000 \\
 \hline
 050.00 \text{ or } 50
 \end{array}$$

**Example Problem #2:** Find 8% of 40 =

Example Problem	Find 8%	Of	40	=	?
Work the Problem	8% = 0.08	X	40	=	3.2

**Example Problem #3:** Find 65 ½ % of 20 =

Example Problem	Find 65 ½ or 65.5%	Of	20	=	?
Work the Problem	65.5% = 0.655	X	20	=	13.1

## PERCENT PRACTICE

### **Rules:**

1. Change the % number to a decimal by placing a decimal two spaces to the left. If there is no decimal place it two numbers from the right.
2. Multiply the numbers together.

**Example:** 35% of 60 = re-write as  $0.35 \Delta 60 = \boxed{21}$

1. 50% of 150 =
2. 12.5% of 200 =
3. 80% of 50 =
4. 20% of 335 =
5. 65% of 100 =
6. 60% of 50 =
7. 25% of 96 =
8. 20% of 125 =
9. 50% of 60 =
10.  $33 \frac{1}{3}\%$  of 105 =
11. 10% of 410 =
12. 50% of 96 =
13. 30% of 99 =
14.  $33 \frac{1}{3}\%$  of 150 =
15. 25% of 52 =

## MATH ANSWERS

### Page 2 - Addition

1. 59 55 24 89 25
2. 58 44 59 99 82
3. 29 85 62 100 108

### Page 3- Subtracting

1. 112 131 209 207
2. 148 76 542 112
3. 105 207 945 321
4. 205 305 550 235

### Page 4- Multiplying

- |       |       |       |
|-------|-------|-------|
| 954   | 820   | 2,448 |
| 1,896 | 256   | 2,331 |
| 700   | 2,032 | 858   |

### Page 7 - Decimals

1. 23.264
2. 8.634
3. 28.45
4. 5.75
5. 3.185
6. 16.781
7. 23.712
8. 74.958
9. 0.5742
10. 2.58
11. 4.375
12. 95
13. 1.5
14. 5.76
15. 6.8

### Page 15 - Fractions

1.  $1 \frac{3}{28}$
2.  $6 \frac{5}{12}$
3.  $1 \frac{1}{4}$
4.  $5 \frac{29}{40}$
5.  $\frac{10}{33}$
6.  $2 \frac{13}{20}$
7.  $\frac{37}{40}$
8.  $\frac{1}{2}$
9.  $1 \frac{9}{16}$
10.  $\frac{5}{12}$
11.  $7 \frac{7}{24}$
12.  $20 \frac{4}{15}$
13.  $2 \frac{4}{7}$
14.  $3 \frac{1}{9}$
15.  $2 \frac{5}{12}$
16.  $1 \frac{1}{4}$

### Page 17 - Percentages

1. 75
2. 25
3. 40
4. 67
5. 65
6. 30
7. 24
8. 25
9. 30
10. 35
11. 41
12. 48
13. 30
14. 50
15. 13

## MORE MATH PRACTICE

### 1. Addition

- $0.2 + 0.35 + 0.0037 =$  \_\_\_\_\_
- $0.4 + 0.003 + 0.421 =$  \_\_\_\_\_
- $0.222 + 0.0003 + 0.216 =$  \_\_\_\_\_
- $3.15 + 0.237 =$  \_\_\_\_\_
- $3.007 + 0.2 =$  \_\_\_\_\_

### 2. Subtraction

- $0.2 - 0.03 =$  \_\_\_\_\_
- $0.37 - 0.205 =$  \_\_\_\_\_
- $2.5 - 1.8 =$  \_\_\_\_\_
- $4.5 - 0.127 =$  \_\_\_\_\_
- $5.5 - 5.017 =$  \_\_\_\_\_

### 3. Multiplication

- $5 \times 0.4 =$  \_\_\_\_\_
- $7 \times 0.137 =$  \_\_\_\_\_
- $5 \times 3.5 =$  \_\_\_\_\_
- $10 \times 0.07 =$  \_\_\_\_\_
- $100 \times 0.0238 =$  \_\_\_\_\_

### 4. Division

- $0.2 / 100 =$  \_\_\_\_\_
- $0.35 / 25 =$  \_\_\_\_\_
- $2.5 / 3 =$  \_\_\_\_\_
- $1.45 / 15 =$  \_\_\_\_\_
- $3.15 / 10 =$  \_\_\_\_\_

### 5. Fractions

- $2/5 + 1/8 =$  \_\_\_\_\_
- $2 \frac{1}{2} - 1 \frac{3}{4} =$  \_\_\_\_\_
- $2/3 \times 1/4 \times 3/5 =$  \_\_\_\_\_
- $1/8 / 3/5 =$  \_\_\_\_\_
- Change  $3/4$  to a decimal = \_\_\_\_\_

### 6. Percentages

- 25% of 4.8 = \_\_\_\_\_
- 30% of 17 = \_\_\_\_\_
- 15% of 36 = \_\_\_\_\_
- 75% of 74 = \_\_\_\_\_
- 63% of 97 = \_\_\_\_\_

### 7. Ratio / Proportion

Find x in the following:

- $5:200 :: x:40$  \_\_\_\_\_
- $1/2 : 2 :: 1/4 : x$  \_\_\_\_\_
- $x : 30 :: 4 : 10$  \_\_\_\_\_
- $0.05 : x :: 0.15 : 30$  \_\_\_\_\_
- $20 : 60 :: x : 50$  \_\_\_\_\_

## MORE MATH PRACTICE ANSWERS

### 1. Addition

- a.  $0.2 + 0.35 + 0.0037 = .5537$
- b.  $0.4 + 0.003 + 0.421 = 0.824$
- c.  $0.222 + 0.0003 + 0.216 = .4383$
- d.  $3.15 + 0.237 = 3.387$
- e.  $3.007 + 0.2 = 3.207$

### 2. Subtraction

- a.  $0.2 - 0.03 = .17$
- b.  $0.37 - 0.205 = 0.165$
- c.  $2.5 - 1.8 = 0.7$
- d.  $4.5 - 0.127 = 4.373$
- e.  $5.5 - 5.017 = 0.483$

### 3. Multiplication

- a.  $5 * 0.4 = 2.0$
- b.  $7 * 0.137 = 0.959$
- c.  $5 * 3.5 = 17.5$
- d.  $10 * 0.07 = 0.70$
- e.  $100 * 0.0238 = 2.38$

### 4. Division

- a.  $0.2 / 100 = 0.002$
- b.  $0.35 / 25 = 0.014$
- c.  $2.5 / 3 = 0.833$
- d.  $1.45 / 15 = 0.0966$
- e.  $3.15 / 10 = 0.315$

### 5. Fractions

- a.  $2/5 + 1/8 = 21/40$
- b.  $2 \frac{1}{2} - 1 \frac{3}{4} = 3/4$
- c.  $2/3 * 1/4 * 3/5 = 1/10$
- d.  $1/8 / 3/5 = 5/24$
- e. Change  $3/4$  to a decimal = .75

### 6. Percentages

- a. 25% of 4.8 = 1.200
- b. 30% of 17 = 5.10
- c. 15% of 36 = 5.40
- d. 75% of 74 = 55.50
- e. 63% of 97 = 61.11

### 7. Ratio / Proportion

Find x in the following:

- a.  $5:200 :: x:40$   $x = 1$
- b.  $1/2 : 2 :: 1/4 : x$   $x = 1$
- c.  $x : 30 :: 4 : 10$   $x = 12$
- d.  $0.05 : x :: 0.15 : 30$   $x = 10$
- e.  $20 : 60 :: x : 50$   $x = 16.66$

## FORMULA FOR DOSE CALCULATIONS

### Formula One

<b>FORMULA</b>	<b>Form of Medication</b>	<b>Formula</b>	<b>Long hand</b>	<b>Calculator</b>
	Pills	$\frac{D}{H} = X$	$H \overline{) \frac{X}{D}}$	$D \div H = X$
Liquid Medication	$\frac{D}{H} Q = X$	$H \overline{) \frac{X^1}{D}} \quad Q = \boxed{X}$	$D \div H \quad Q = X$	

### Legend for the Formula

= × (Multiply the numbers together)

**D** = MD order

**H** = Dose on hand/Supply

**X** = The amount of medication to give

**X<sup>1</sup>** = A temporary answer

**Q** = Amount of liquid that a set amount of medication is diluted by.  
*It does not mean how much liquid is in the bottle.*

### Example of Q:

*On Hand (H) = MedZ 10mg/5ml*

$\Rightarrow$       $\Rightarrow$   
**H**     **Q**

H=10mg  
Q=5ml



## Liquids: Medication Formula Steps

<b>Step 1</b>	<b>Is the MD order (D) unit and the on hand (H) unit the same?</b>	
	<b>Yes</b> = Go onto step 2 <b>No</b> = Convert the <u>MD order</u> to the unit on hand. <i>(See metric conversion chart)</i>	
<b>Step 2</b>	$\frac{D}{H} \quad Q = X$	Divide the amount ordered by the amount on hand
<b>Step 3</b>	Always double-check your answer & Make sure it is labeled correctly!	

### Liquid formula example:

MD order: MedZ concentrate 750 mg IM now.

On Hand: MedZ concentrate 1 g/2 cc's .

**Step 1:** Convert the MD order with the formula on the **metric conversion chart**.

**Conversion factor:** 1000 milligrams (mg) = 1 gram (g), so the conversion factor = **1000**

**Rule:** To convert larger unit to smaller unit multiply by the conversion factor

**Rule:** To convert smaller unit to a larger unit divide by the conversion factor

**Rule:** Only convert the unit of the MD order, never convert the unit you have on hand. The unit must be the same for both the supply and MD order prior to working the formula. Once you have divided the unit is cancelled out.

Milligrams (smaller) ↓ Grams (larger) = *divide by 1000*

$$D = 750 \text{ mg} = \underline{\hspace{1cm}} \text{ g}$$

$$D = 750 \div 1000 = 0.75 \text{ g}$$

$$D = \mathbf{0.75 \text{ g}}$$

$$\begin{aligned} D &= 0.75 \text{ g} \\ H &= 1 \text{ g} \\ Q &= 2 \text{ cc's} \end{aligned}$$

**Step 2:** Follow the formula  $\frac{D}{H} \quad Q = X$

Formula	Long hand	Calculator
$\frac{D}{H} \quad Q = \boxed{X}$	$H \overline{) \frac{X^1}{D}} \quad Q = \boxed{X}$	$D \div H \quad Q = \boxed{X}$
$\frac{0.75 \text{ g}}{1 \text{ g}} \quad 2 = \boxed{1.5 \text{ cc's}}$	$1 \text{ g} \overline{) \frac{0.75}{0.75 \text{ g}}} \quad 2 = \boxed{1.5 \text{ cc's}}$	$0.75 \text{ g} \div 1 \text{ g} \quad 2 \text{ cc's} = \boxed{1.5 \text{ cc's}}$

**Step 3:** Double-check your answer & Make sure it is labeled correctly!

# METRIC CONVERSION CHART

What is the “**conversion factor**” for grams to milligrams?  $1\text{ g} = 1000\text{ mg}$ , “conversion factor” is **1000**. Conversion factors are **in bold**. With exception of cc to ml (because they are equal), the conversion factor is

LIQUID MEASUREMENT		WEIGHT		OTHER	
METRIC	APOTHECARY	METRIC	APOTHECARY	METRIC	
* <b>1000</b> ml	1 quart	<b>30</b> g	1 oz	* <b>5</b> cc	1 TSP
* <b>500</b> ml	1 pint	1 g	<b>15</b> grains	* <b>15</b> cc's	1 TBSP
* <b>30</b> ml	1 fluid oz	* <b>60</b> mg	1 grain	<b>240</b> cc's	1 CUP
1 ml	<b>15 OR 16</b> minims	1 mg	<b>1/60</b> grains	* 1 kg	<b>2.2</b> pou
<b>0.06</b> ml	1 minim				

METRIC CONVERSIONS			
UNITS OF VOLUME (LITER)		UNITS OF SOLIDS	
* 1 cc	1 ml	* 1 g	<b>1000</b> mg
* 1 liter	<b>1000</b> ml	* 1 mg	<b>1000</b> mcg
1 L	<b>100</b> centiliters	1 g	<b>100</b> centigrams
1 L	<b>10</b> deciliters	1 g	<b>10</b> decigrams
1 dekaliter	<b>10</b> L	1 dekagram	<b>10</b> g
1 hectoliter	<b>100</b> L	1 hectogram	<b>100</b> g
1 kiloliter	<b>1000</b> L	1 kilogram	<b>1000</b> g

∅ To convert *from a smaller unit to a larger unit* **Divide** by the conversion factor listed above

∅ To convert *from a larger unit to a smaller unit* **Multiply** by the conversion factor listed above

How do you know what unit is smaller or larger than another? Here is a table that compares the size of metric units against

## DECIMAL FINDER

\$1000	\$100	\$10	\$1	.10¢	.01¢	.001¢	.
THOUSANDS	HUNDREDS	TENS	ONES	TENTHS	HUNDREDTHS	THOUSANDTHS	MIL
KILO	HECTO	DEKA	<b>SINGLE UNIT</b>	DECI	CENTI	<b>MILLI</b>	M
k	h	dk	<b>g, L, or m</b>	d	c	<b>m</b>	

## DOSAGE CALCULATIONS: RATIO FORMULA

### Formula Two: Ratio

#### Example:

**MD Order:** MedQ 2 g po now

**On Hand:** MedQ 500 mg tablets

From Conversion Chart

1 g **is to** 1000 mg

**as**

MD order to On Hand Unit (unknown number of mg)

2 g **is to** X mg

### STEP ONE: CONVERSION

MD **unit** ordered & On Hand **unit** as listed on the conversion chart

$$1\text{g} = 1000\text{mg}$$

MD amount ordered, labeled with **unit** & X = amount of **unit** needed

$$2\text{g} = X\text{mg}$$

Unit Ordered : Unit On Hand :: Amount Ordered : Amount of Unit Needed

$$1\text{g} : 1000\text{mg} :: 2\text{g} : X\text{mg}$$

“is to”            “as”            “is to”

(1 is to 1000 as .2 is to X)

$$1 : 1000 :: 2 : X$$

$$1 \quad X = 2 \quad 1000$$

$$X = 2000\text{mg}$$

### STEP TWO: CALCULATION

Now you have converted the MD order (2 grams) into the unit on hand (2000 mg), next find the amount of medication to give Use the ratio of:

Converted

On Hand Dose : per Amount :: MD order : X – Amount to give

$$500\text{mg} : 1\text{tab} :: 2000\text{mg} : X\text{tabs}$$

$$500 \quad X = 2000 \quad 1$$

$$\frac{500X}{500} = \frac{2000}{500} \cdot 1$$

$$X = 4\text{ tablets}$$

## INSTRUCTIONS TO CALCULATE MEDICATIONS BY WEIGHT

In some cases medications will be ordered based on the weight of the patient. Usually this requires the MA to figure out what the patients weight is in kilograms (kg).

You may wish to practice this by taking your own weight in pounds, place it into your calculator and divide it by the conversion factor of 2.2.

The answer will be your weight in kg (might be nice to list this on your drivers license).

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If the order reads: MedX 5mg/kg PO now

You would read it “MedX 5 milligrams per (or for each) kilogram by mouth now”

### STEPS:

1. Determine the patients weight in kilograms (Lbs divided by conversion factor 2.2)
  2. Multiply the ordered medication by the number of kg.
  3. Final answer is then what the physician really ordered.
- 

### Example:

Mr. James weighs 264 Lbs. The physician has ordered for MexX 5mg/kg as listed above.

1.  $264 \text{ Lbs} \div 2.2 = \boxed{120 \text{ kg}}$

2.  $5 \text{ mg} \cdot 120 \text{ kg} = \boxed{600 \text{ mg}}$

3. The physician really ordered **600 mg** to be given by mouth now to Mr. James.

## Practice Problems for Conversions

Complete the following by using your Metric Conversion Chart, Step one of the Dosage Calculation Formula, or using the Ratio method of converting. ALWAYS LABEL YOUR ANSWER!

Correct each problem prior to moving onto your next problem.

1. 100 Lbs = \_\_\_\_\_ KG
2. 155 Lbs = \_\_\_\_\_ KG
3. 180 Lbs = \_\_\_\_\_ KG
4. 2.5 g = \_\_\_\_\_ mg
5. 1500 mg = \_\_\_\_\_ g
6. 750 mg = \_\_\_\_\_ g
7. 0.5 g = \_\_\_\_\_ mg
8. 5 tsp = \_\_\_\_\_ mL
9. 2 Tbsp = \_\_\_\_\_ tsp
10. 5 mL's = \_\_\_\_\_ cc's

## Dosage Calculation Practice Worksheet

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Correct each problem right after you complete it.

***Tip#1: By correcting each problem as you complete it, you will reinforce good math habits and immediately discover problem areas rather than repeating any habitual error with other problems.***

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1. \_\_\_\_\_ MD Order: MedX 1.5g PO. On Hand: MedX 750mg tabs. How many tablets will you give?
2. \_\_\_\_\_ MD Order: MedX 1.5g IM. On Hand: MedX 500mg/cc. How many mg do you give? How many cc's do you draw up? \_\_\_\_\_
3. \_\_\_\_\_ MD Order: MedK 25mg PO. On Hand: MedK 10mg tabs. How many tablets do you give?
4. \_\_\_\_\_ MD Order: MedA 3g PO. On Hand: MedA 750mg tabs. How many tablets do you give?
5. \_\_\_\_\_ MD Order: MedK elixer 125mg PO. On Hand: MedK elixer 25mg/5cc. How many cc's do you give?
6. \_\_\_\_\_ MD Order: MedA elixer 1g PO. On Hand: MedA elixer 200mg/3cc. How many cc's do you give?
7. \_\_\_\_\_ MD Order: MedX 60mg IM. On Hand: MedX 100mg/cc. How many cc's do you inject?
8. \_\_\_\_\_ MD Order: ZMed 650mg. On Hand: ZMed 325mg. How many tablets do you give?
9. \_\_\_\_\_ MD Order: KrZMED 2g PO. On Hand: KrZMED 500mg tablets. How many tablets do you give?
10. \_\_\_\_\_ MD Order: MedQ 1500mg PO. On Hand: MedQ 1g tablets. How many tablets do you give?
11. \_\_\_\_\_ Mr. Smith weighs 180 pounds. MD Order: MedX 5mg/kg PO. How many kg's does Mr. Smith weigh? How many mg of MedX is Mr. Smith going to receive? (you may round off to the nearest kg)  
\_\_\_\_\_
12. \_\_\_\_\_ Mr. Jones weighs 240 pounds. MD Order: MedX 2mg/kg. How many kg's does Mr. Jones weigh? How many mg of MedX is Mr. Jones going to receive? \_\_\_\_\_

**Page 26- Answers Practice Problems For Conversions**

1. 45.45 KG
2. 70.45 KG
3. 81.81 KG
4. 2500 mg
5. 1.5 g
6. 0.75 g
7. 500 mg
8. 25 mL
9. 6 tsp
10. 5 cc's

**Page 27- Dosage Calculations Practice Worksheet Answers:**

1. 2 tablets
2. 1500 mg; 3 cc's
3. 2 ½ tablets
4. 4 tablets
5. 25 cc's
6. 15 cc's
7. 0.6 or 0/60 cc's
8. 2 tablets
9. 4 tablets
10. 1 ½ tablets
11. 82 kg; 410 mg
12. 109 kg; 218 mg