

BOSTON REED

Clinical Medical Assistant Program
Math Review Handout

Contents

Addition.....Page 2

Subtraction.....Page 3

Multiplication.....Page 4

DecimalsPage 5

Decimal Practice MathPage 7

Fractions.....Page 8

Fraction Practice MathPage 15

Percentages.....Page 16

Percentage Practice MathPage 17

Math AnswersPage 18

More Math PracticePage 19

Answers for More Math PracticePage 20

Math Formulas for Dose Calculations.....Page 21

Medication Dose By WeightPage 26

Conversion Practice Worksheet.....Page 27

Dose Calculation Practice WorksheetPage 28

Practice Worksheet Answers.....Page 29

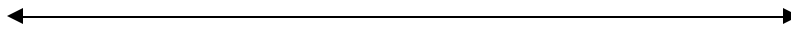
Addition of 3 Numbers

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

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

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>
----	-------------------	-------------------	-------------------	-------------------

2.	353 <u>-205</u>	326 <u>-250</u>	870 <u>-328</u>	258 <u>-146</u>
----	--------------------	--------------------	--------------------	--------------------

3.	694 <u>-589</u>	786 <u>-579</u>	971 <u>-26</u>	777 <u>-456</u>
----	--------------------	--------------------	-------------------	--------------------

4.	219 <u>-14</u>	493 <u>-188</u>	800 <u>-250</u>	550 <u>-315</u>
----	-------------------	--------------------	--------------------	--------------------

Multiplying Three-Digit Numbers by One Digit

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

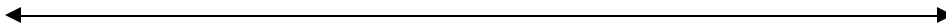
$$\begin{array}{r} 128 \\ \times 4 \\ \hline 12 \end{array}$$

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

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.

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

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

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

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

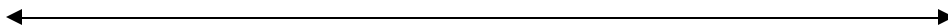
$$\begin{array}{r} 128 \\ \times 2 \\ \hline \end{array}$$

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

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

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

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



Math Review for Decimals

General Rules for Addition, Subtraction, Multiplication, & Division of Decimals

- When you have a whole number that does not have a decimal, place the decimal after the last number on the right. Added zeros are underlined in these examples.

Example:

Whole number: 32
Change to: 32.0

- You may add zeros after the decimal or after the last number that is to the right of the decimal if you need a placeholder.

Example:

Whole number: 12.6
Change to: 12.60

Additional Rules for Addition & Subtraction of Decimals

- Always line up the decimal points for each number, as shown in the problems below.

Addition Problem: $8.5 + 19.06 + 40 + 21.13 + 0.89 =$

Rewrite:

$$\begin{array}{r} \\ \\ \\ \\ \\ + \\ \hline 89.58 \end{array}$$

*Add columns starting on the right.
Work from the top down.*

Subtraction Problem: $1025 - 248.6 =$

Rewrite:

$$\begin{array}{r} 1025.\underline{0} \\ - 248.6 \\ \hline 776.4 \end{array}$$

*Subtract columns
starting on the right.
Remember to "borrow" from the
number to the left if needed.*

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.

Example

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

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

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).

$$\begin{array}{r}
 2.2 \overline{) 13.75} \\
 \uparrow \quad \uparrow
 \end{array}$$

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

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

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 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

Whole number → is the “2”	$2 \frac{1}{3}$	← Numerator is the “1”
		↙ Denominator is the “3”

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

<p>How To Find The Lowest Common Denominator (LCD)</p>	<p>Rule: When adding or subtracting with fractions you must have the same denominator for each fraction before adding/subtracting.</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>EXAMPLE OF FINDING THE LOWEST COMMON DENOMINATOR →</p> <p>(Shown vertically, but may be done horizontally)</p> <p>Solving the same → problem</p> <p>(Shown horizontally, but may be done vertically)</p>	<p>Example:</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> <hr/> <p><u>What number do both 4 and 5 go into evenly? Answer: 20</u> What number do we have to multiply 5 by to get 20? <u>Answer: 4</u> What number do we have to multiply 4 by to get 20? <u>Answer: 5</u></p> $\frac{1}{4} \times \frac{5}{5} = \frac{5}{20}$ $\frac{3}{5} \times \frac{4}{4} = \frac{12}{20}$ $\frac{5}{20} + \frac{12}{20} = \frac{17}{20}$ <p>Rule: 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</p> <p>* Dashed boxes around fraction indicate the number is from the original problem</p>

<p>Making A Mixed Fraction From An Improper Fraction:</p>	<p>Example #1: 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: $\frac{28}{3}$</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;"> $3 \overline{) 28}$ $\underline{-27}$ 1 </div> <div style="margin-left: 20px;"> <div style="border: 1px solid black; padding: 2px; display: inline-block;">← New whole number - “9”</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">← New top number- Numerator- “1”</div> </div> </div> <p>You would write your final answer like this:</p> <div style="display: flex; align-items: center; justify-content: center;"> $\frac{28}{3} = 9 \frac{1}{3}$ </div>
--	--

<p>Finding The Common Factor So That You Can Reduce To Lowest Terms :</p>	<p>Steps:</p> <ol style="list-style-type: none"> 1. Factor both the N and the D. 2. Find the common factor, the one that both numbers can be divided by. 3. Divide each number by the factor. 4. Check answer to see if it can be factored out further. Are there no other common factors left? <p>Example:</p> <p>If you have an answer of: $\frac{5}{25}$</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;"> $\frac{5 \div 5}{25 \div 5} = \frac{1}{5}$ </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>
--	---

<p><u>ADDITION AND SUBTRACTION:</u></p>	<p>Rules:</p> <ol style="list-style-type: none"> 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. 														
<h2 style="margin: 0;">Addition</h2>															
<p>Example of Addition:</p>	$1 \frac{3}{4} + \frac{1}{3} = \text{---}$														
<p>Step 1</p> <p>Get Rid Of The Whole Number →</p>	$1 \frac{3}{4} = $ <table border="1" style="display: inline-table; margin-left: 20px;"> <tr> <td>W#</td><td>×</td><td>D</td><td>+</td><td>N</td><td>=</td><td>New N</td> </tr> <tr> <td>1</td><td>×</td><td>4</td><td>+</td><td>3</td><td>=</td><td>7</td> </tr> </table> <div style="border: 1px solid black; padding: 5px; margin: 10px auto; width: fit-content;"> <p>*New “improper” fraction:</p> $\frac{7}{4}$ </div> <p>* Place New (N) numerator over the old (D) denominator to make your new fraction.</p>	W#	×	D	+	N	=	New N	1	×	4	+	3	=	7
W#	×	D	+	N	=	New N									
1	×	4	+	3	=	7									
<p>Steps 2, 3 & 4</p> <p>Find The Lowest Common Denominator →</p> <p>Add numerators together →</p>	<p><u>What number do both 4 and 3 go into evenly? Answer: 12</u></p> <p><i>What number do we have to multiply 3 by to get 12? Answer: 4</i></p> <p><i>What number do we have to multiply 4 by to get 12? Answer: 3</i></p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>W#=1</td> <td>D=4</td> <td>N=3</td> </tr> </table> $\frac{21}{12} = \frac{3}{3} \times \frac{7}{4} + \frac{1}{3} \times \frac{4}{4} = \frac{4}{12}$ $\frac{21}{12} + \frac{4}{12} = \frac{25}{12} = \text{---}$	W#=1	D=4	N=3											
W#=1	D=4	N=3													
<p>Reduce To Lowest Terms →</p>	$12 \overline{) \begin{array}{r} 25 \\ -24 \\ \hline 1 \end{array}} \qquad \frac{25}{12} = \boxed{2 \frac{1}{12}}$														

Subtraction

Example of Subtraction:	Example: $1 \frac{3}{4} - \frac{1}{3} = \underline{\hspace{2cm}}$														
Step 1: Follow the formula → New fraction →	$1 \frac{3}{4} = $ <table border="1" style="display: inline-table; border-collapse: collapse; text-align: center;"> <tr> <td>W#</td> <td>×</td> <td>D</td> <td>+</td> <td>N</td> <td>=</td> <td>New N</td> </tr> <tr> <td>1</td> <td>×</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: 10px 0;">*New “improper” fraction: $\frac{7}{4}$</div> <div style="border: 1px solid black; padding: 5px; display: inline-block; 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>	W#	×	D	+	N	=	New N	1	×	4	+	3	=	7
W#	×	D	+	N	=	New N									
1	×	4	+	3	=	7									
Steps 2, 3 & 4 Find The Lowest Common Denominator → Subtract 2 nd numerator from the 1 st numerator →	<p><u>What number do both 4 and 3 go into equally? Answer: 12</u> <u>What number do we have to multiply 3 by to get 12? Answer: 4</u> <u>What number do we have to multiply 4 by to get 12? Answer: 3</u></p> $\frac{21}{12} = \frac{3}{3} \times \frac{7}{4} - \frac{1}{3} \times \frac{4}{4} = \frac{4}{12}$ $\frac{21}{12} - \frac{4}{12} = \frac{17}{12} = \underline{\hspace{2cm}}$														
Reduce To Lowest Terms →	$12 \overline{) 17} \begin{array}{r} 1 \\ -12 \\ \hline 5 \end{array} \qquad \frac{17}{12} = \boxed{1 \frac{5}{12}}$														

Multiplication

MULTIPLICATION	<p>Steps:</p> <ol style="list-style-type: none"> 1. <i>No common denominator is needed!</i> 2. If you have a mixed fraction change to an improper fraction 3. Multiply the numerators straight across. 4. Multiply the denominators straight across. 5. Reduce to lowest terms.
<p>Steps 1 & 2: N/A</p> <p>Steps 3 & 4:</p>	<p>Example:</p> $\frac{3}{4} \times \frac{1}{3} = \frac{3}{12}$
<p>Step 5:</p> <p style="text-align: center;">Reduce Fraction To Lowest Terms</p>	<p>The factors of 3 are 1 & 3</p> <p>The factors of 12 are 1, 2, 3, 4, 6, & 12</p> $\frac{3}{12} \div \frac{3}{3} = \frac{1}{4}$ <p>Rule: 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

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

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	=	50

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 $0.35 \times 60 = \boxed{21}$

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. $20 : 60 :: x : 50$ $x = 16.66$

Liquids: Medication Formula Steps

Step 1	Is the MD order (D) unit and the on hand (H) unit the same? Yes = Go onto step 2 No = Convert the <u>MD order</u> to the unit on hand. <i>(See metric conversion chart)</i>
Step 2	$\frac{D}{H} \cdot Q = X$ Divide the amount ordered by the amount on hand
Step 3	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 $\frac{D}{H} \cdot Q = X$

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

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 g = 1000 mg, “conversion factor” is **1000**. Conversion factors are **in bold**. With exception of cc to ml (because they are equal), the conversion factor is NEVER one.

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

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

GRAM	G	WEIGHT
METER	M	LENGTH
LITER	L	VOLUME

- 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

* Memorize

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

DECIMAL FINDER

\$1000	\$100	\$10	\$1	.10¢	.01¢	.001¢	.00001¢
THOUSANDS	HUNDREDS	TENS	ONES	TENTHS	HUNDRETHS	THOUSANDTHS	MILLIONTHS
KILO	HECTO	DEKA	SINGLE UNIT	DECI	CENTI	MILLI	NANO
k	h	dk	g, L, or m	d	c	m	n
						mc	

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

1g = 1000 mg

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

2 g = X mg

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

1 g : 1000 mg :: 2 g : X mg
 "is to" "as" "is to"

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

1 : 1000 :: 2 : X

$$1 \bullet X = 2 \bullet 1000$$

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

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:

On Hand Dose : per Amount :: ^{Converted} MD order : X – Amount to give

500 mg : 1 tab :: 2000 mg : X tabs

$$500 \bullet X = 2000 \bullet 1$$

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

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

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).

If the order reads: MedX 5 mg/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 5 mg/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

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.

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