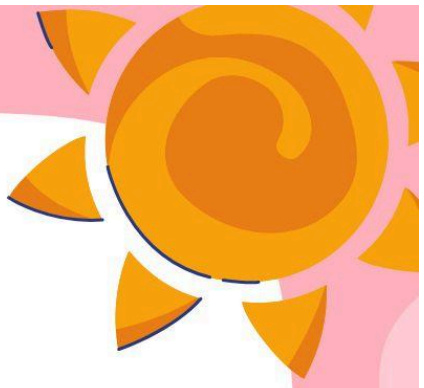
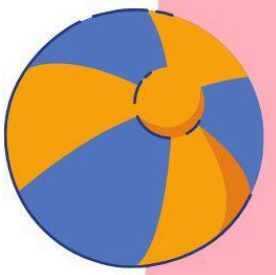




SUMMER MATH PACKET

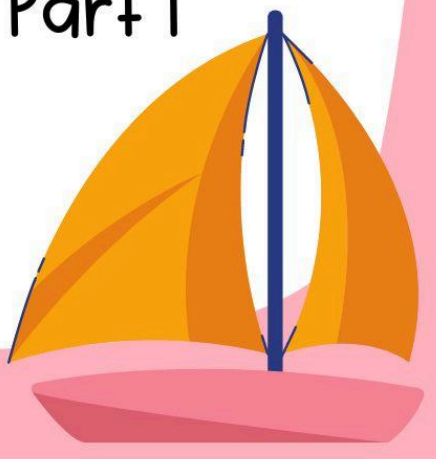


For students entering

8th Grade Algebra I Part I





For Students Entering Algebra I Part I

Table of Contents

Rename Fractions, Decimals and Percents

Hints/Guide:

To convert fractions into decimals, we start with a fraction, such as $\frac{3}{5}$, and divide the numerator (the top number of a fraction) by the denominator (the bottom number of a fraction). So:

$5\overline{)3.0} = 0.6$ and the fraction $\frac{3}{5}$ is equivalent to the decimal 0.6.

To convert a decimal to a percent, we multiply the decimal by 100 (percent means a ratio of a number compared to 100). A short-cut is sometimes used by moving the decimal point to places to the right (which is equivalent to multiplying a decimal by 100, so 0.6 x 100 = 60 and $\frac{3}{5}$ = 0.6 = 60%.

To convert a percent to a decimal, we divide the percent by 100, $60\% \div 100 = 0.6$ **so** $60\% = 0.6$**. To convert a fraction into a percent, we can use a proportion to solve,**

$\frac{3}{5} = \frac{x}{100}$**, so** $5x = 300$**, which means that** $x = 60 = 60\%$**.**

Exercises: NO CALCULATORS!

Rename each fraction as a decimal:

1. $\frac{1}{5} =$ **2.** $\frac{3}{4} =$ **3.** $\frac{1}{2} =$

4. $\frac{1}{3} =$ **5.** $\frac{8}{10} =$ **6.** $\frac{2}{3} =$

Rename each fraction as a percent:

7. $\frac{1}{5} =$ **8.** $\frac{3}{4} =$ **9.** $\frac{1}{2} =$

10. $\frac{1}{3} =$ **11.** $\frac{8}{10} =$ **12.** $\frac{2}{3} =$

Rename each percent as a decimal:

13. $8\% =$ **14.** $60\% =$ **15.** $11\% =$

16. $12\% =$ **17.** $40\% =$ **18.** $95\% =$

Fraction Operations

Hints/Guides:

When adding and subtracting fractions, we need to be sure that each fraction has the same denominator, then add or subtract the numerators together.

For example: $\frac{1}{8}+\frac{3}{4}=\frac{1}{8}+\frac{6}{8}=\frac{1+6}{8}=\frac{7}{8}$

That was simple because it was easy to see what the new denominator should be, but what about if it is not so apparent?

For example: $\frac{7}{12}+\frac{8}{15}$.

In this case, we must find the Lowest Common Denominator (LCD) for the two denominators, 12 and 15.

12: 12, 24, 36, 48, (60), 72, 84,... LCM of 12 and 15 is 60.

15: 15, 30, 45, (60), 75,...

So, $\frac{7}{12}+\frac{8}{15}=\frac{35}{60}+\frac{32}{60}=\frac{35+32}{60}=\frac{67}{60}=1\frac{7}{60}$ Note: Be sure answers are in simplest form.

To multiply fractions, we multiply the numerators together and the denominators together, and then simplify the product. To divide fractions, we find the reciprocal of the second fraction (keep-change-flip) and then multiply the two together.

For example, $\frac{2}{3}\bullet\frac{1}{4}=\frac{2}{12}=\frac{1}{6}$ and $\frac{2}{3}\div\frac{3}{4}=\frac{2}{3}\bullet\frac{4}{3}=\frac{8}{9}$

Exercises: Perform the indicated operation. SHOW ALL WORK! If needed, use a separate piece of paper and staple to this page. NO CALCULATORS!

1. $\frac{1}{4}+\frac{3}{5}=$
2. $\frac{6}{7}+\frac{2}{3}=$
3. $\frac{2}{5}+\frac{8}{9}=$
4. $\frac{3}{4}-\frac{2}{3}=$
5. $\frac{2}{5}-\frac{2}{9}=$
6. $\frac{9}{11}-\frac{2}{5}=$
7. $\frac{1}{3}\bullet\frac{2}{3}=$
8. $\frac{3}{4}\bullet\frac{3}{5}=$
9. $\frac{7}{8}\bullet\frac{2}{5}=$
10. $\frac{3}{8}\div\frac{3}{4}=$
11. $\frac{1}{4}\div\frac{1}{4}=$
12. $\frac{7}{11}\div\frac{3}{5}=$

Multiply Fractions and Solve Proportions

Hints/Guide:

To solve problems involving multiplying fractions and whole numbers, we must first place a one under the whole number, then multiply the numerators together and the denominators together. Then, we simplify the answer.

Example: $\frac{6}{7} \bullet 4 = \frac{6}{7} \bullet \frac{4}{1} = \frac{24}{7} = 3\frac{3}{7}$

To solve proportions, one method is to determine the multiplying factor of the two equal ratios.

Example: $\frac{4}{9} = \frac{24}{x}$ since 4 is multiplied by 6 to get 24, we multiply 9 by 6 so $\frac{4}{9} = \frac{24}{54}$.

Since the numerator of the fraction on the right must be multiplied by 6 to get the numerator on the left, then we must multiply the denominator of 9 by 6 to get the missing denominator, which must be 54.

Exercises: Solve (for problems 8-15, solve for N). SHOW ALL WORK! If needed, use a separate sheet of paper and attach. NO CALCULATORS!

1. $4 \bullet \frac{3}{4} =$

2. $\frac{1}{5} \bullet 7 =$

3. $8 \bullet \frac{1}{5} =$

4. $6 \bullet \frac{3}{7} =$

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

6. $\frac{2}{3} \bullet 6 =$

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

8. $\frac{1}{5} = \frac{n}{20}$

9. $\frac{3}{n} = \frac{12}{28}$

10. $\frac{1}{n} = \frac{5}{25}$

11. $\frac{n}{4} = \frac{3}{12}$

12. $\frac{3}{7} = \frac{12}{n}$

13. $\frac{n}{9} = \frac{12}{27}$

14. $\frac{2}{3} = \frac{18}{n}$

15. $\frac{2}{7} = \frac{n}{21}$

Multiply Mixed Numbers

Hints/Guide:

To multiply mixed numbers, we first convert the mixed numbers into improper fractions. This is done by multiplying the denominator by the whole number part of the mixed number and then adding the numerator to this product, and this is the numerator of the improper fraction. The denominator of the improper fraction is the same as the denominator of the mixed number.

For example, $3\frac{2}{5}$ **leads to** $3 \bullet 5 + 2 = 17$ **so** $3\frac{2}{5} = \frac{17}{5}$.

Once the mixed numbers are converted into improper fractions, we multiply and simplify just as with regular fractions.

For example, $5\frac{1}{5} \bullet 3\frac{1}{2} = \frac{26}{5} \bullet \frac{7}{2} = \frac{182}{10} = 18\frac{2}{10} = 18\frac{1}{5}$.

Exercises: Solve and write your answer in simplest form. SHOW ALL WORK! If needed, use a separate sheet of paper and attach. NO CALCULATORS!

1. $3\frac{1}{3} \bullet 4\frac{1}{2} =$

2. $2\frac{2}{3} \bullet 1\frac{1}{4} =$

3. $1\frac{1}{9} \bullet 4\frac{3}{5} =$

4. $4\frac{3}{4} \bullet 1\frac{1}{5} =$

5. $3\frac{1}{3} \bullet 6\frac{4}{5} =$

6. $6\frac{2}{3} \bullet 7\frac{3}{7} =$

7. $1\frac{4}{5} \bullet 1\frac{2}{3} =$

8. $2\frac{2}{5} \bullet 4\frac{2}{7} =$

9. $4\frac{1}{3} \bullet 1\frac{1}{8} =$

Dividing Mixed Numbers

Hints/Guide:

To divide mixed numbers, we must first convert to improper fractions using the technique shown on the multiplying mixed numbers page. Once we have converted to improper fractions, the process is the same as dividing regular fractions.

For example: $2\frac{1}{2} \div 3\frac{1}{3} = \frac{5}{2} \div \frac{10}{3} = \frac{5}{2} \bullet \frac{3}{10} = \frac{15}{20} = \frac{3}{4}$ **&** $3\frac{1}{2} \div 8\frac{2}{3} = \frac{7}{2} \div \frac{26}{3} = \frac{7}{2} \bullet \frac{3}{26} = \frac{21}{52}$

Exercises: Solve and write your answer in simplest form. SHOW ALL WORK! If needed, use a separate piece of paper and attach. NO CALCULATORS!

1. $1\frac{1}{5} \div 4\frac{2}{5} =$

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

3. $5\frac{1}{5} \div 6\frac{2}{3} =$

4. $\frac{8}{9} \div 2\frac{3}{5} =$

5. $3\frac{2}{3} \div 4\frac{3}{7} =$

6. $4\frac{4}{7} \div \frac{4}{9} =$

7. $6\frac{1}{5} \div 8\frac{2}{5} =$

8. $4\frac{1}{4} \div \frac{5}{7} =$

9. $6\frac{4}{7} \div 3\frac{3}{5} =$

Decimal Operations

Hints/Guide:

When adding and subtracting decimals, the key is to line up the decimals above each other, add zeros as placeholders so all of the numbers have the same place value length, then use the sale rules as adding and subtracting whole numbers.

The answer will have a decimal point in line with the problem. For example,

$34.5 + 6.72 + 9.045 =$

$$\begin{array}{r} 34.500 \\ 6.720 \\ +\ 9.045 \\ \hline 50.265 \end{array}$$

To multiply decimals, the rules are the same as multiplying whole numbers, until the product is determined and the decimal point must be located. The decimal point is placed the same number of digits in from the right side of the product as the number of decimal place values in the numbers being multiplied.

For example, $8.54 \bullet 17.2$, since $854 \bullet 172 = 146888$, then we count the number of decimal places in the numbers being multiplied (3) and move in from the right three places, so the final product is 146.888.

To divide decimals by a whole number, the division process is the same as for whole numbers, but the decimal points are lined up in the dividend and the quotient. For example,

To divide 51.06 by 3, the process is the same as if the problem were 5,106 divided by 3,
with the decimal point from the quotient moving straight up into the quotient to create the final answer of 17.02.

$$\begin{array}{r} 17.02 \\ 3\overline{)51.06} \end{array}$$

Exercises: Solve. SHOW ALL WORK! If needed, use a seperate sheet of paper and attach. NO CALCULATORS!

1. $15.7 + 2.34 + 5.06 =$

2. $64.038 + 164.8 + 15.7 =$

3. $87.4 - 56.09 =$

4. $5.908 - 4.72 =$

5. $68.9 - 24.74 =$

6. $955.3 - 242.7 =$

7. $63 \times 0.14 =$

8. $0.87 \times 2.1 =$

9. $8.94 \times 2.3 =$

10. $4.2 \times 0.62 =$

11. $35\overline{)70.35}$

12. $7\overline{)25.83}$

13. $14\overline{)45.584}$

Find Percent of a Number

Hints/Guide:

To determine the percent of a number, we must first convert the percent into a decimal by dividing by 100 (SHORTCUT - move the decimal point in the percentage two places to the LEFT), then multiply the decimal by the number.

For example: $45\%\ of\ 240\ =\ 45\%\ \times\ 240\ =\ 0.45\ \times\ 240\ =\ 108$

Exercises: Solve for n. SHOW ALL WORK! If needed, use a separate piece of paper and attach. NO CALCULATORS!

1. $30\%\ of\ 450\ =\ n$

2. $7\%\ of\ 42\ =\ n$

3. $10\%\ of\ 321\ =\ n$

4. $15\%\ of\ 54\ =\ n$

5. $65\%\ of\ 320\ =\ n$

6. $80\%\ of\ 64\ =\ n$

7. $9\%\ of\ 568\ =\ n$

8. $15\%\ of\ 38\ =\ n$

9. $25\%\ of\ 348\ =\ n$

10. $85\%\ of\ 488\ =\ n$

11. $90\%\ of\ 750\ =\ n$

12. $6\%\ of\ 42\ =\ n$

13. $60\%\ of\ 78\ =\ n$

14. $4\%\ of\ 480\ =\ n$

15. $10\%\ of\ 43\ =\ n$

16. $24\%\ of\ 54\ =\ n$

Solve Problems using Percent

Hints/Guide:

When solving percent problems, we apply the rules for finding percent of a number in real-life situations. For example, to find the amount of sales tax on a $450.00 item if the tax rate is 5%, we find 5% of 450 (0.05 x 450 = 22.5), and then label our answer in dollars. This would give us a tax rate of $22.50.

Exercises: Solve. SHOW ALL WORK! If needed, use a separate piece of paper and attach. NO CALCULATORS!

1. Susie has just bought a pair of jeans for $45.00, a sweater for $24.00, and a jacket for $85.00. The sales tax is 5%. What is her total bill?

2. Jack bought a set of golf clubs for $250.00 and received a rebate of 20%. How much was the rebate?

3. A construction manager calculates it will cost $2,890 for materials for her next project. She must add 10% for scrap and extras. What will be the total cost?

4. The regular price for a video game system is $164.50 but is on sale for 30% off. What is the amount of the discount?

What is the sale price?

5. Cindy earns a 15% commission on all sales. On Saturday, she sold $980 worth of merchandise. What was the amount of commission she earned on Saturday?

6. The band had a fundraiser and sold $25,000 worth of candy. They received 40% of this amount for themselves. How much did they receive?

Mean, Median and Mode

Hints/Guide:

We need to define some terms to solve problems involving mean, median and mode.

- **Mean is the sum of the numbers being considered divided by the total number of numbers being considered (also called the "average").**
- **Median is the number in the middle of the date set. This is best found after all numbers have been placed in order from least to greatest. If there's an even number of elements, the median is found by adding the two numbers left together and dividing by 2.**
- **The mode is the number or numbers that occur most frequently in a data set.**

For example, with the data set of 56, 62, 67, 45, 81, 76:

Mean is $56 + 62 + 67 + 45 + 81 + 76 = 387 \div 6 = 64.5$**, so the mean is 64.5.**

Median is (in order the data is 45, 56, 62, 67, 76, 81), the middle two numbers are 62 and 67, add together to get 129 and divide by 2 to get a median of 64.5.

There is NO mode because no number occurs more than one time.

Exercises: SHOW ALL WORK! NO CALCULATORS! If needed, use a separate sheet of paper and attach.

Find the mean, median and mode of each of the following data sets:

1. 54, 65, 74, 35, 87

2. 54.6, 45.98, 67.4, 55.6, 45.7, 58.9

3. 122, 145, 156, 176, 198, 202

4. 11, 14, 16, 15, 32, 23, 27, 27, 23, 43

5. 6, 7, 8, 4, 6, 5, 8, 3, 6, 8, 5, 4

6. $-4, 7, -3, 4, 8, 12, -5, -3, 8, 16, 9$

7. 43, 56, 98, 67, 87

8. 12, 15, 14, 18, 33, 32, 24, 26, 27

9. Write a data set that has 5 numbers with a mean of 84 and a median of 86.

Integers I

Hints/Guide:

To add integers with the same sign (both positive or both negative), add their absolute values and use the same sign in your answer. To add integers of opposite signs, find the difference of their absolute values and then take the sign of the larger absolute value in your answer.

To subtract integers, add its additive inverse.

For example, $6 - 11 = a$ **—> this becomes** $6 + \ -11 = a$ **and solves as** $-5 = a$**.**

Exercises: Solve the following problems. NO CALCULATORS!

1. $6 + (-7) =$

2. $(-4) + (-5) =$

3. $6 + (-9) =$

4. $(-6) - 7 =$

5. $6 - (-6) =$

6. $7 - (-9) =$

7. $5 + (-8) =$

8. $-15 + 8 =$

9. $14 + (-4) =$

10. $-9 - (-2) =$

11. $-7 - 6 =$

12. $-8 - (-19) =$

13. $29 - 16 + (-5) =$

14. $-15 + 8 - (-19) =$

15. $45 - (-13) + (-14) =$

16. $-15 - 9 - 6 =$

17. $-7 + (-6) - 7 =$

18. $29 - 56 - 78 =$

19. $17 + (-7) - (-5) =$

20. $45 - (-9) + 5 =$

Integers II

Hints/Guides:

The rules for multiplying integers are:

positive • positive = positive **negative • negative = positive**

positive • negative = negative **negative • positive = negative**

The rules for dividing integers are the SAME as multiplying integers.

Exercises: Solve the following problems. NO CALCULATORS!

1. $(4) \cdot (-3) =$

2. $(-12) \cdot (-4) =$

3. $(-8)(-3) =$

4. $\frac{-14}{2} =$

5. $\frac{6(-4)}{8} =$

6. $\frac{-63}{7} =$

7. $6(-5) =$

8. $8(-4-6) =$

9. $-6(9-11) =$

10. $\frac{-14}{2} + 7 =$

11. $8 - \frac{-15}{-3} =$

12. $-3 + \frac{-56}{2^3} =$

13. $\frac{-6-(-8)}{-2} =$

14. $-7 + \frac{4+(-6)}{-2} =$

15. $45 - 4(5 - (-3)) =$

16. $(-4+7)(-5+3) =$

17. $16 - (-3)(-7+5) =$

18. $\frac{4+(-6)-5-3}{-6+4} =$

Solving Equations I

Hints/Guide:

The key in solving an equation is to isolate the variable, to get the letter by itself. In one-step equations, we merely undo the operation (perform the inverse) - addition is the opposite of subtraction and multiplication is the opposite of division. Remember the golden rule of equation solving: IF we do something to one side of the equation, we MUST do the exact same thing to the other side.

Examples:

Equation with Addition	Equation with Subtraction	Equation with Multiplication	Equation with Division
$x + 5 = 6$ $-5 \quad -5$ $x = 1$	$t - 6 = 7$ $+6 \quad +6$ $t = 13$	$\frac{4x}{4} = \frac{16}{4}$ $x = 4$	$6 \bullet \frac{r}{6} = 12 \bullet 6$ $r = 72$
Check: $1 + 5 = 6$ $6 = 6$	**Check:** $13 - 6 = 7$ $7 = 7$	**Check:** $4(4) = 16$ $16 = 16$	**Check:** $72 \div 6 = 12$ $12 = 12$

Exercises: **Solve the following problems. SHOW ALL WORK! If needed, use a separate piece of paper and attach. NO CALCULATORS!**

1. $x + 8 = 13$

2. $t - 9 = 4$

3. $4t = -12$

4. $\frac{r}{4} = 24$

5. $y - 4 = 3$

6. $h + 8 = 5$

7. $\frac{p}{8} = -16$

8. $-5k = 20$

9. $9 - p = 17$

Solving Equations II

Hints/Guide:

The key to solving equations is to isolate the variable, to get the letter by itself. In two-step equations, we must undo addition and subtraction first, then multiplication and division. Remember the golden rule of equation solving: IF we do something to one side of the equation, we MUST do the exact same thing to the other side.

Examples:

$4x - 6 = 14$ $+6 \quad +6$ $\frac{4x}{4} = \frac{8}{4}$ $x = -2$	$\frac{x}{-6} - 4 = -8$ $+4 \quad +4$ $-6 \bullet \frac{x}{-6} = -4 \bullet -6$ $x = 24$
Check: $4(-2) - 6 = -14$ $-8 - 6 = -14$ $-14 = -14$	**Check:** $(24/-6) - 4 = -8$ $-4 - 4 = -8$ $-8 = -8$

Exercises: **Solve the following problems. SHOW ALL WORK! If needed, use a separate piece of paper and attach. NO CALCULATORS!**

1. $4t - 6 = 22$

2. $\frac{m}{-5} + 6 = -4$

3. $-4r + 5 = 25$

4. $\frac{x}{3} - 7 = 6$

5. $5g + 3 = -12$

6. $\frac{y}{-2} + (-4) = 8$