

Jackson School District: High School

ALGEBRA 1 RECOMMENDED SUMMER ASSIGNMENT

The areas below are all significant topics that are important to your success in Algebra 1. These are all skills that have been taught in our middle school curriculum. Complete these problems without the use of a calculator. After completing, check your work with the answers to see how you did.

- **PART 1: PRE-ALGEBRA REVIEW**
 - Factors and Multiples
 - Fractions, decimals and percents
 - Ratio and rate
 - Counting methods
 - Perimeter, area and volume
- **PART 2: THE REAL NUMBER LINE**
 - Comparing Numbers
 - Ordering numbers from least to greatest
- **PART 3: BASIC COMPUTATION (WITHOUT A CALCULATOR!)**
 - Addition of real numbers
 - Subtraction of real numbers
 - Multiplication of real numbers
 - f The Distributive Property
 - Division of real numbers
- **PART 4: ORDER OF OPERATIONS**
 - Evaluating expressions containing exponents
- **PART 5: LINEAR EQUATIONS AND INEQUALITIES**
 - Evaluate a variable expression
 - Translate a verbal model into an algebraic expression or equation
 - Solve one-step and multi-step linear equations and inequalities
 - Graph linear inequalities on a number line
- **PART 6: TABLES AND GRAPHS**
 - Use tables and graphs to represent data
 - Use tables and graphs to interpret data numerically and algebraically
 - Find measures of central tendency
- **PART 7: PROBABILITY AND ODDS**
 - Find the probability & odds of an event

Anything you need to review should be researched on the Internet. See suggested websites below. There are also many more websites available on the internet. Flash cards are recommended as a good way to practice basic number facts. Try and attempt all problems before checking the answers

Reference Sheet

Greatest Common Factor: The largest number that is a factor (divides evenly into) of both numbers.

Least Common Multiple: The smallest number that is a multiple (think multiply) of both numbers.

- Fraction → Decimal: Divide numerator by the denominator
- Decimal → Percent: Move decimal point right two places
- Percent → Decimal: Move decimal point left two places
- Percent → Fraction: put percent value as numerator, 100 as the denominator
- Percent Proportion: $\frac{\text{is}}{\text{of}} = \frac{\%}{100}$

Perimeter:

- Rectangle = $2l + 2w$
- Square = $4s$
- Triangle = sum of all the sides

Area:

- Square = s^2
- Rectangle = $l \cdot w$
- Triangle = $\frac{1}{2}bh$

Adding and Subtracting Integers:

- Same Sign: add and keep the sign
- Different Signs: subtract and keep the sign of the larger number
- With fractions you need a Common Denominator (Least Common Multiple)

Order of Operations: Parentheses, Exponents, \times and \div from left to right, $+$ and $-$ from left to right.
OR: PEMDAS, "Please Excuse My Dear Aunt Sally"

Solving linear equations & inequalities:

1. Simplify if needed (distribute, combine like terms on the same side of the equation or inequality)
2. If there are variables on *both* sides, use inverse operations so that only one variable term remains in the equation or inequality
3. Use inverse operations to isolate the variable.
 - a. First add or subtract the constant
 - b. Multiply or divide by the variable's coefficient. If the coefficient is a fraction: multiply *both* sides by its reciprocal!

***One special rule to remember for inequalities: If you must multiply (or divide) both sides of the inequality by a negative number, you MUST flip the inequality symbol!**

Mean: the average of the values in a data set

Median: the middle value when data in a set is listed in order

Mode: the value of data in a set that appears most often

$$\text{Probability} = \frac{\text{Favorable Outcomes}}{\text{Total Outcomes}}$$

$$\text{Odds} = \frac{\text{Favorable Outcomes}}{\text{Unfavorable Outcomes}}$$

Name: _____

PART 1
PRE-ALGEBRA REVIEW

<p>Find the greatest common factor and least common multiple. Show your work.</p> <p>1) 20 and 25</p>	<p>Find the greatest common factor and least common multiple. Show your work.</p> <p>2) 6 and 14</p>
<p>3) Convert the fractions into percents:</p> <p>a. $\frac{4}{5}$</p> <p>b. $\frac{12}{25}$</p> <p>c. $\frac{4}{3}$</p>	<p>4) Convert the percents into fractions:</p> <p>a. 12%</p> <p>b. 7%</p> <p>c. 130%</p>
<p>5) The student council is selling sweatshirts with the school name and emblem. The shirts come in three different colors, two different styles and three different sizes. How many different types of sweatshirts are available?</p>	

6) Solve the following percent problems.

- a. What is 30% of 70 feet?

- b. Fourteen dollars is 25% of what amount of money?

- c. One hundred thirty-five is what percent of 27?

- d. You are charged 6.5% tax on a \$42 purchase. Find the amount of tax.

7) Write the ratios in lowest terms:

- a. 75 to 20

- b. 162: 36

- c. $\frac{60}{85}$

8) Find the unit rate:

- a. \$90 for 4 tickets

- b. 208 miles in 4 hours

9) Find the perimeter and area of each figure:

- a. A square with a side length of 3.5 inches.

- b. A rectangle with length 7km and width 4km.

- c. An isosceles triangle with legs of 35ft, base of 28ft and interior height of 21ft. (Hint: Sketch and label the triangle.)

10) Find the volume of each figure. Remember, for a rectangular prism (box), $V=lwh$.

- a. A cube with sides of length 5ft

- b. A box with length 15 yd, width 7 yd and a height of 4 yd.

PART 2
THE REAL NUMBER LINE

11) Compare the two numbers. Write the answer using $<$, $>$ or $=$.

a. 23.03 23.3

b. 0.058 0.102

c. $\frac{5}{9}$ $\frac{15}{27}$

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

e. $1\frac{7}{10}$ $1\frac{3}{4}$

f. -14 -15

12) Order the numbers from least to greatest

a. 9.027, 9.10, 9.003, 9.3, 9.27

b. $1\frac{2}{5}$, $\frac{7}{4}$, $\frac{5}{3}$, $1\frac{1}{8}$, $\frac{15}{16}$

13) You need a piece of trim $6\frac{5}{8}$ yards long to complete a craft project. You have a piece $6\frac{3}{4}$ yards long left over from another project. Is the trim long enough?

PART 3
BASIC COMPUTATION
(NO CALCULATOR)

14) $1\frac{3}{7} + \frac{1}{2}$	15) $4\frac{3}{8} - 2\frac{5}{6}$
16) $1\frac{2}{3} \times 2\frac{5}{9}$	17) $2\frac{1}{4} \div 1\frac{1}{3}$
18) $2\frac{1}{3} + \frac{5}{6} + \frac{1}{2}$	19) $\frac{2}{5} - 1 + \frac{3}{5}$
20) $\left(-\frac{1}{2}\right)\left(\frac{3}{5}\right)\left(-\frac{2}{3}\right)\left(\frac{5}{8}\right)$	21) $-7\frac{4}{5} \div \left(-1\frac{3}{10}\right)$

Simplify using the distributive property.

22) $-2(x - 24)$	23) $\frac{1}{4}(x + 16)$
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PART 4
ORDER OF OPERATIONS
NO CALCULATOR

Simplify the following expressions.

24) $-10 \div (3 + 2) + 9$	25) $[(7 - 4)^2 + 3] + 15$
26) $[10 + (5^2 \cdot 2)] \div 6$	27) $\frac{1}{3}(-9 \cdot 3) + 18$
28) $\frac{(3 \cdot 7) + 9}{2^3 + 5 - 3}$	29) $\frac{6 + 7^2}{3^3 - 9 - 7}$
30) $23 - [\frac{1}{2}(12 \div 3)^2 + 8]$	31) $9 \div [\frac{2}{3}(11 - 2)^2]$

PART 5
LINEAR EQUATIONS AND INEQUALITIES

Solve the equation or inequality. Graph the solutions to the inequality on a number line.
NO CALCULATOR!!!

32) $2x - 7 = 17$

33) $-5 = \frac{3}{8}(x - 1)$

34) $\frac{3}{4}x + 5 \leq 8$

35) $-(4 + x) > 2(x - 5)$

36) $\frac{x}{4} = -\frac{x}{2} - 1$

37) $0 \geq -3x - 6$

Evaluate. Remember to use the order of operations!

38) $\frac{3}{4} \cdot x$, when $x = \frac{2}{3}$

39) $(4x)^2$, when $x = 2$

40) $3x^2 + 8$, when $x = 5$

41) $5x^2$, when $x = -2$

Write the sentence as an equation or inequality then solve for the number n.

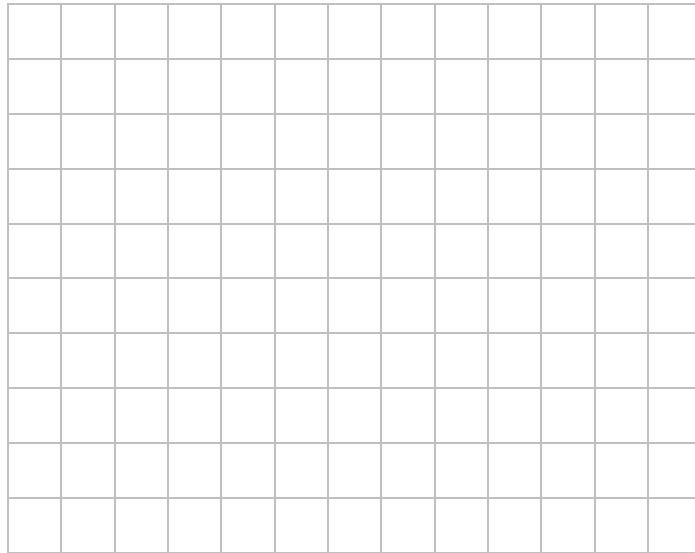
42) Thirteen less than the product of 25 and a number n is 37.

43) The sum of five and a number n is at least 12.

PART 6
TABLES AND GRAPHS

44) The cost to spend a day at the local amusement park is \$25 for parking and \$40 per person for entrance into the park. Assuming you have a van that can hold up to 10 people, complete the table of values below and construct a scatterplot on the grid to represent the cost of admission for yourself and up to nine of your friends. Use the table and the graph to answer the following questions.

Number of People	Cost of Admission



a) By analyzing your table and/or graph, what is the relationship between the amount of people going into the park and the total cost of admission? Explain in sentences.

b) Write an equation that models the total cost of admission to the park, y , in terms of x , the number of people going.

c) If you and all nine of your friends wanted to go, how much would each person have to pay if you split the cost equally?

45) You are considering buying two different cars. Car A is \$45,000 and decreases in value every year after purchase by \$5,000. Car B is \$30,000 and decreases in value every year after purchase by \$2,000. Complete the table of values below and construct *two* line graphs on the same grid below to represent the value of *both* cars over time.

Age of Car in Years	Value of Car A	Value of Car B



a) Write an equation that models the total value of Car A, y , in terms of x , the age of the car in years. Write a similar equation that models the total value of Car B in terms of the age of the car in years.

Car A:

Car B:

b) After how many years will the value of the two cars be the same? How do you know?

c) Suppose you know you will be keeping whichever car you selected, A or B, for seven years. After seven years, you hope to buy a new car and use the decreased value of car A or B at that time as down payment for another new car. Given this information, which car would you choose to buy now, A or B? Use the table or graph or both to support your reasoning. Write your answer in complete sentences!

46) Use the values listed below to find all measures of central tendency:

18, 23, 17, 30, 13, 22, 20, 20, 7, 22, 25, 15, 13, 30, 15, 5, 30, 21, 30, 10

Mean =

Median =

Mode =

PART 7 PROBABILITY AND ODDS

Find the probability and odds of randomly choose a red marble from the given bag of red and white marbles.

47) Number of red marbles: 16 Number of marbles: 64 Probability = Odds =	48) Number of red marbles: 8 Number of marbles: 40 Probability = Odds =
49) Number of red marbles: 7 Number of marbles: 20 Probability = Odds =	50) Number of red marbles: 24 Number of marbles: 32 Probability = Odds =