



Name \_\_\_\_\_

## *Herndon Middle School* *Algebra 1 Summer Mathematics Packet*

*Dear Students:* The purpose of this packet is to review pre- algebra concepts as you look forward to Algebra 1 next year at HMS. Please show all your work for each problem. You may use a calculator for every section **except** part 1. This packet will be due the first Friday of school in September. Be prepared for a quiz on this material.

### Part 1. Number Sense

*Order of Operations*—Simplify each of the following mathematical expressions. These should be done **without** a calculator.

1)  $14 \div 7 + 3^2$

2)  $42 \div 2(-12 + 9)$

3)  $\sqrt{49}$

4)  $|-14|$

5)  $18 - 30 \div 5$

6)  $48 \div (5 + 7) - 9$

7)  $4^3 - 5(2) + 13$

*Adding/Subtracting/Multiplying/Dividing Positive and Negative Numbers--*  
This is also done **without** a calculator.

8)  $-2 + 11 - 7$

9)  $5 - 3 + 12 - 9$

10)  $\frac{-4}{\left(\frac{3}{4}\right)}$

11)  $(-2)(4)(-5)(-1)$

12)  $-4 + -9 -3(-6)$

13)  $\left(\frac{3}{5}\right)\left(-\frac{7}{12}\right)$

*Evaluating Expression*—you may use a calculator on this, but show substitutions and steps.

14)  $3(n - 1) + 2n$ , when  $n = 5$

15)  $7b - 2a$ , when  $a = -3$  and  $b = 4$

16)  $3x^2 + 5x + 1$ , when  $x = -2$

17)  $\frac{2r}{t} + 7$ , when  $r = 12$  and  $t = 3$

18)  $(3x)^2 - 7y^2$ , when  $x = 3$  and  $y = 2$

19)  $4(3d + 6) - 2d$ , when  $d = -6$

## Part 2: Equations

### *Properties*

Match each equation on the left with the property it illustrates on the right.

\_\_\_\_ 20)  $4 + (9 + 6) = (4 + 9) + 6$

A. Identity property of multiplication

\_\_\_\_ 21)  $x + 12 = 12 + x$

B. Associative property of addition

\_\_\_\_ 22)  $(3 + y) + 0 = 3 + y$

C. Distributive Property

\_\_\_\_ 23)  $x * 1 = x$

D. Identity property of addition

\_\_\_\_ 24)  $5(x + y) = 5x + 5y$

E. Commutative property of addition

## Solving Equations.

Here are some examples:

|   |   |  |
|---|---|--|
| $\begin{array}{r} -2y + 9 = 7 \\ \underline{-9 \quad -9} \\ -2y = -2 \\ \underline{-2 \quad -2} \\ y = 1 \end{array}$ | $\begin{array}{r} 2x + 3 = x + 10 \\ \underline{-3 \quad -3} \\ 2x = x + 7 \\ \underline{-x \quad -x} \\ x = 7 \end{array}$ | $\begin{array}{r} 3b + 2 = 6(3 - b) \\ 3b + 2 = 18 - 6b \\ \underline{-2 \quad -2} \\ 3b = 16 - 6b \\ \underline{+6b \quad +6b} \\ 9b = 16 \\ \underline{9 \quad 9} \\ b = 16/9 \end{array}$ |
|---|---|--|

Solve the equation.

25)  $14 = b + 5$

26)  $5r = 22$

27)  $\frac{x}{4} = -9$

28)  $3x - 5 = 13$

29)  $\frac{1}{4}d + 2 = 3$

30)  $-21 - 5x = 64$

31)  $3y + 2y = 81 - 6$

32)  $18y - 21 = 15y + 3$

33)  $\frac{2a}{7} = \frac{2}{3}$

34)  $2(x - 4) = 12$

35)  $3(y - 4) = -2y - 12$

## Distributive Property

Example:  $4(x + 5) = 4(x) + 4(5) = 4x + 20$

36)  $3(b + 9)$

37)  $5(2x - 3)$

38)  $-3(4x + 9)$

39)  $x(2x + 4)$

40)  $\frac{1}{2}(4r + 12)$

## Part 3. Patterns, Functions, and Algebra

41. Find the **next three numbers** in the pattern.

3, 7, 11, 15, 19, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_

42. Find the **next three numbers** in the pattern.

1, 2, 4, 8, 16, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_

Use the function tables given to find the function rules.

43.

| x | ? _____ |
|---|---------|
| 4 | -12     |
| 5 | -15     |
| 6 | -18     |
| 7 | -21     |
| 8 | -24     |

44.

| x | ? _____ |
|---|---------|
| 1 | 1       |
| 2 | 4       |
| 3 | 7       |
| 4 | 10      |
| 5 | 13      |

You will find help on these topics at the following websites:

1. <http://www.regentsprep.org> - use the Math A site
2. <http://www.math.com> - use both Algebra and Pre-Algebra
3. [http:// library.thinkquest.org](http://library.thinkquest.org)
4. [http://www.mathgoodies.com/lessons/toc\\_vol5.html](http://www.mathgoodies.com/lessons/toc_vol5.html) - there are others on here, but this is the integer site
5. [http://www.teacherschoice.com.au/Maths\\_Library/Algebra/Alg\\_1.htm](http://www.teacherschoice.com.au/Maths_Library/Algebra/Alg_1.htm)
6. <http://education.jlab.org/solquiz>
7. [http://w3.fiu.edu/math/cine\\_math/fast/pie.htm](http://w3.fiu.edu/math/cine_math/fast/pie.htm) -- solving equations
8. <http://www.algebrahelp.com/worksheets/>

1. Part 4: Applications

1. What is 50% of the sum of the first 10 odd numbers?
2. Evaluate  $\frac{1}{a} + 3a$  if  $a = \frac{1}{2}$ . Express your answer as a mixed number.
3. Insert the fewest number of grouping symbols to make the following equation true:  
$$24 \div 3 + 9 \times 5 - 2 = 6$$
4. A student who is 5'6" casts a 4' shadow. How many feet tall is a nearby tree which casts a 24' shadow?
5. If eight students scored 100 on a test, twelve scored 90, and eight scored 80, what was the mean of the students' scores?
6. If 24 students in a class of 30 students were present, what percent of the students were absent?
7. If the price of a shirt is reduced by 20% to \$14.40, find the original price.
8. Karen opened a checking account by depositing \$500. She wrote checks for \$13.85, \$28.14, and \$230.18. She made a deposit which was a tenth of the opening balance. What is the balance in her account?

9. The tax on a car costing \$9,200 is \$368. At the same tax rate, what will the tax be on a car costing \$12,500?
- a) \$437.50                      b) \$562.50  
c) \$250                              d) \$500
10. Last year, Central High School had 800 students. This year's enrollment dropped to 600. What was the percent of decrease?
- a) 75%                              b)  $33\frac{1}{3}\%$   
c) 25%                              d)  $133\frac{1}{3}\%$
11. A rubber ball bounces exactly half as high as it did on the previous bounce. It bounces 128 feet high on the first bounce. How high does it bounce on the 12th bounce? Express your answer as a common fraction.
12. Bob lives eight blocks due east of Helen. Helen lives three blocks due west of Ilene. Where does Ilene live in relation to Bob?
13. Bob saves  $\$x$  per month for three months. His father gives him \$40 and he has enough money to buy the \$115 tennis shoes he wants. Which equation shows this information?
- a)  $3x + 25 = 115$     b)  $115 - 40 = 3x$   
c)  $3x + 40 = 115$     d)  $40 - 3x = 115$