Holy Cross Academy **Honors Algebra I**

Pre-Algebra Review Packet

The problems in this packet are intended to review what you should already know from a Pre-Algebra/Algebra Course. The skills selected are those that we will be using in the study of Honors Algebra I. If you get stuck on any question you can ask another mathematics teacher for assistance or research the information on the Internet. This background information will appear at various times throughout this course and you will be expected to know it. Please feel free to email a Holy Cross mathematics teacher with any questions.

Part I: Number Sense

Please convert the following decimals to fractions in their simplest form

1) 0.45 2) 0.54 3) 3.677 4) 4.081

5) 0.00101 6) $0.\overline{3}$ 7) $0.\overline{35}$ 8) $1.1\overline{24}$

Rules of Exponents

9) $x^4 \cdot x^3$ 10) $4m^3 2m^4$ 11) $\left(3x^5\right)^3$ 12) $\left(4r^0\right)^4$

13) $(2x^4z^2)(3x^4yz^2)$ 14) $(x^2y)^2(x\ y^2)^3$ 15) $\frac{2x^4y^2z}{4x^2}$ 16) $\frac{a^4b^3c^3}{a^2b^3c^5}$

17) $\left(4x^3\right)^{-2}$ 18) $(x^{-3}yz^4)^3(x^{-1}y^3z^{-2})^{-1}$ 19) $\frac{4x^5y^{-3}z^2}{8x^{-2}}$ 20) $\frac{a^{-7}b^{11}c^5}{a^4b^{-2}c^{10}}$

Please use Factor Trees to factor these numbers down to a product of prime factors. Use exponents to represent repeated multiplication

21) 1323 22) 5070 23) 53352 24) 91728

Part II: Numerical Operations

25) $45+(-75)+(-37)$ 26) $13-14+8-36+14-7$ 27) $32-5\times7$

28) $12\times5\div(13-9)$ 29) $12\div3\times6+2(11-5)\div3$ 30) $(-4)(-17)(-5)$

31) $\frac{3+(5\times4)-4^2}{7\times3-(5^2)}$ 32) $\frac{8\times5+3\times4}{3(5-7)}$ 33) $\left|14\right|-\left|-18\right|+\left|-9\right|$

34) $35-\left|-17\right|+\left|-18\right|-\left|-19\right|$ 35) $\left|6-19\right|+\left|14-33\right|+4\left|-7\right|$

36) $\frac{4(3-1)}{2+3}+\frac{2-5+6-8}{5(4^2-2(1^3+3\cdot2)}$ 37) $(3+5\cdot2+3\cdot4+(2-2)^{12})+18\div3\cdot5$

38) $\dfrac{2[3+4-6(3-1)^2]+6\cdot 5}{\dfrac{4-2\cdot 3}{3-8\div 2}}$

Find each percent change to the nearest percent. State if it is an increase or decrease.

39) From 45ft to 57ft

40) From 56.5 ounces to 72 ounces

41) From 237 minutes to 58 minutes

42) From 965 hours to 1003 hours

43) From 79 days to 45 days

44) From 3100m to 2987m

45) From 5001 liters to 489 liters

46) From 171 degrees to -48 degrees

47) 35.5mph to 23.4mph

Compare. Write <, =, or >. **(1 point each)**

48) 0.3449 ____ $0.3449\overline{9}$

49) $\frac{5}{4}$ _____ 0.8

50) –16.1 ____ $-16.\overline{11}$

Part III: Geometry

Answer the following questions

51) A rectangular water tank has a capacity of 105 cubic meters. The length is two meters and height is eight meters. What is the width of the tank?

52) The perimeter of a square is *x* feet. What is its area?

53) A prism has a volume of 540 cubic yards, a width of nine yards, and a height of six yards. What is the length of the prism?

54) A rug has an area of 39 square feet. If it has a length of 5 feet, what is its width?

55) The addition Maria had built on her house adds more than 600 square feet to the floor area. The floor area of the house is now more than 2,400 square feet. What could have the dimensions of the room have been before the addition?

56) What is the length of the hypotenuse of a right triangle if the sides are 5m and 6m?

57) If the longest side of a right triangle is 15 and another side is 9, what is the measure of the third side?

58) Each side of a cube has a length of 13 centimeters. What is the volume of the cube?

59) If an isosceles right triangle has a leg measure 6.25. What is the measure of the shortest side?

60) What is the area and perimeter of a rectangular stage that is 51 feet long and 28 feet wide?

61) Sketch and label a trapezoid that has an area of 900cm²

62) Change one number in the diagram you drew for the last question so that the area is now 450cm².

63) Find the diameter of a circle so that its area is twice the value of the circumference

Part IV: Patterns

For the next set of problems (64-66) use the following information: For all real numbers a and b $a \lambda b = 5(2a - b)$

64) Find $a \lambda b$ for a least five pairs of numbers

65) Is the operation commutative? If so, explain how you know. If not, give a counterexample

66) Is the operation associative? If not, give a counterexample.

67) Consider an operation ¥ that is defined for only six whole numbers: 0, 1, 2, 3, 4, 5. The result a ¥ b is the remainder when a + b is divided by 6. Complete the table below for the operation

¥	0	1	2	3	4	5
0						
1						
2						
3						
4						
5						

Part V: Measurement

Measurement Vocabulary. From the vocabulary list below, chose the term(s) that best complete each sentence. Write the term(s) in the space(s) provided.

Capacity	length	scientific notation
Decimal number	metric system	rational number
Compatible numbers	negative exponent	terminating decimal
Mass	repeating decimal	negative power of 10

68) 13.25 is called a _____.

69) A decimeter is a metric unit of _____.

70) A kiloliter is a metric unit of _____.

71) When a lesser integer is divided by a greater integer, the quotient will be a _____.

72) A hectogram is a metric measure of _____.

73) _____ is a more compact method of expressing large numbers and very small decimal numbers.

74) 2.125125… or $2.\overline{125}$ is called a _____

Part VI: Units of Measure.

Rename each unit of measure – express in scientific notation **(2 points each)**

75) 4.45 kg = _____ g
76) 16.5mL = _____L
77) 12.35hm = _____km
78) 546 dm = _____km
79) 10cL = _____hL
80) 3.17cg = _____dag
81) 43.5 kL = _____ L
82) 4.1dg = _____mg
83) 135.9 g = _____mg
84) 0.00011 cg = _____ kg
85) 1.35cL = _____mL
86) 3,050m =_____km

Part VII: Data Analysis (5)

Given the set of numbers, please find the mean, medium and mode
87) 7, 8, 9, 10, 11, 12, 13

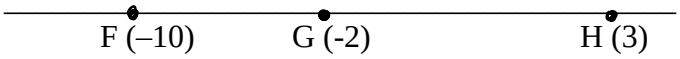
88) 21, 21, 22, 24, 25, 27, 27, 31, 32, 33, 35

89) 2.1, 2.2, 2.4, 2.5, 2.6, 2.7, 2.8, 3.4

90) 0, 3, 5, 2, 5, 4, 6, 7, 6, 2, 9, 10, 11, 2, 4, 5, 6, 7

Part VIII: Probability (10)

91) If a point is chosen at random on $\overline{FG}$, what is the probability that it is within 7.5 units of G?



92) What is the probability of choosing a purple marble from a jar containing 7 green, 4 purple and 2 red marbles?

93) What is the probability of choosing a marble that is not red in problem 82?

94) What is the probability of getting an even number when rolling a single 6-sided dice?

95) What is the probability of choosing a queen, king, or an ace from a standard deck of playing cards?

Part IX: Algebra (translations, substitute a number for a variable, simple simplification)

Part I - Vocabulary: Please put the given terms into the appropriate blank spaces. Fill in the blank with the appropriate word from the word bank. **(1 point each)**

96)_____. An expression that contains a variable is called a **____.**
97)_____. An expression that contains only numbers is call a ____.
98) _____. A(n)___is a mathematical phrase that can contain numbers, operations and variables
99) _____.The set of numbers that a variable may represent is called the ___ of the variable.
100) _____. A(n) ___, a (n) ___ and a(n) ___ are all symbols that denote grouping.
101) _____. Any value of a variable that makes a statement true is said to be the **root** or ____ of the equation
102) _____. The set of all solutions is called the ____ of the equation.
103) _____. A(n) ____ is a symbol used to represent one or more numbers.
104) _____. Addition, subtraction, multiplication and division are considered _____.
105) _____. A(n) ___ is a mathematical statement formed by placing an equals

A) Variable
B) Expression
C) Equation
D) Solution
E) Parenthesis
F) Bracket
G) Replacement Set
H) Division Bar
I) Solution Set
J) Variable Expression
K) Numerical Expression
L) Mathematical Operation

sign between two numerical or variable expressions

106) Six hundred is less than one third of a number

107) Marcus is 72.5 inches tall. This is at least 6 inches taller than Darnell

108) Fourteen less than a number is 12. Find the number.

109) Triple a number minus eight is –12. Find the number.

Evaluate the Expression with the given values. **(3 points each)**

Evaluate each expression if $t = 5, x = 4.5, y = -2, z = -3$

110) $5t - 7$

111) $3xy - t$

112) $6y - tx$

113) $\dfrac{6t + z}{9(t - z)}$

114) $3[z + 5(2y - x)]$

115) $2[x + 4(y + z)]$

Solve and Check

116. $-18 = -42 + 3x$

117. $144 = -12(x + 5)$

118. $-5 = \dfrac{a}{18}$

119. $\dfrac{3}{4}y - 9 = 6$

120. $8x + 3(5 - x) = -25 + 75$

121. $10 - 3 + 1 = \dfrac{3y + 1}{8}$

Part X: Word Problems Solve each of the following word problems. Show all work. **(4 points each)**

122) Paul and Mike work at the refreshment stand at the county fair. The owner of the stand pay the $\frac{1}{7}$ of whatever they sell. In the first hour, Paul sells $57 worth of refreshments. Paul's earnings are half of Mike's. How much does Mike earn in the first hour?

123) The blue whale, presently the largest mammal, weights about 2.16 times more than the largest dinosaur. Blue whales weigh about 1.362×10^5 kilograms. Using scientific notation, about how much did the largest dinosaur weigh?

124) Chris bought apples that cost $1.27 per pound. If he has $9.50, what is the greatest number of pounds of apples he can buy, to the nearest quarter pound?

125) Five students clean the park. They share the money earned equally. They earned exactly $101. If each student worked 2 hours total, how much money per hour did they earn?