NORTHEAST CONSORTIUM

Stat And Math Modeling(SAMM) AP Statistics

Summer Pre-View Packet

DUE THE FIRST DAY OF SCHOOL

The problems in this packet are designed to help you review topics from previous mathematics courses that are important to your success in

Stat and Math Modeling (SAMM) and AP Statistics.

DO ALL PROBLEMS WITHOUT A CALCULATOR. Show all work that leads you to each solution on separate sheets of paper. You may use your notes from previous mathematics courses to help you. You must do all work without any help from another person. Additional copies of this packet may be obtained from the Main Office in your school or printed from the school's website.

Springbrook: www.springbrookmath.org
Paintbranch: www.mcps.k12.md.us/schools/paintbranchhs
Blake: www.mcps.k12.md.us/schools/blakehs

ALL work should be completed and ready to turn in on the FIRST DAY of school. This packet will count as part of your first quarter grade.

ENJOY YOUR SUMMER!! WE ARE LOOKING FORWARD TO SEEING YOU IN THE FALL.

Student Name: _____

School: _____

Date: _____

NEC Stat and Math Modeling (SAMM) and AP Statistics Summer Review

Name _____

USE A SEPARATE SHEET OF PAPER AND SHOW ALL WORK.
PROBLEMS WITH AN ASTERISK (*) ARE FOR AP STAT ONLY.

I. Polynomials

A.   Factor Completely.

1) $t^2 - 4t - 21$ 2) $x^3 - 8$

3) $27x^3 + 125$ 4) $10m^3n^2 - 15m^2n + 25m$

5) $25x^2 - 49$ *6) $x^3 - 2x^2 - 4x + 8$

B. Simplify the following expressions.

1) $(-3x^2 + 4x - 7) + (2x^2 - 7x + 8)$ 2) $5x^2 \bullet 2x^5$ 3) $(-2c^3)^2$

4) $(39a^4 - 4a^3 + 2a^2 - a - 7) - (10a^4 + 3a^3 - 2a^2 - a + 8)$ 5) $\dfrac{10\ 2^6}{8\ 2^{-2}}$

6) $(3x + 7)(2x + 5)$ 7) $-3xy^3(x - 2y)$ 8) $(3x^2 + x - 1)(2x - 3)$

9) $(8a^3b^2)(2a^4b^5)$ 10) $(-3x^2y^3z)^3$ 11) $(15a^4b^2c)^0$

12) $\dfrac{3x^3y^2}{6x^2y^5}$ 13) $(x + 6)^2$ 14) $t^3 \bullet t^{n-3}$

* 15) $(x^m)^n \bullet (x^n)^{n-m}$ * 16) $\dfrac{4^{h-k}}{4^{h+k}}$

C. Solve the following quadratic equations for x.

1) $(2x + 1)(x + 3) = 0$ 2) $x^2 + 6x = 0$

3) $2x^2 + 4x = -3$ 4) $x^2 = 16$

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II. Linear Operations
A. Graph each of the following on graph paper or create your own grid**.**

1) $y = -\dfrac{3}{4}x + 4$ 　　　　　 2) $y = (x - 2)^2 + 1$ 　　　　　 3) $y = |x|$

B. Answer each of the following concerning **linear** equations.

1) Determine the slope of the line containing the points (6, -2) and (-1, 5).

2) Determine an equation for a line with slope ½ and y-intercept at (0, -3).

3) Determine an equation for a line parallel to y = -3x +4, containing the point (2, 1).

III. Rewriting and Solving Equations

A. Solve each equation for y.

1) 7y + 6x = 10 　　　　　　　　　 2) $\dfrac{1}{4}y - 7x = \dfrac{15}{2}$

B. Find the solution(s) of the given systems of equations. Write answers in the form (x, y).
1)   2x + 5y = -7 　　　　　　　 2) 4x + 9y = 2
　　 7x + y = - 8 　　　　　　　　　 2x + 6y = 1

C. Solve for x and y. Use matrices for #6.

1) $\begin{bmatrix} 4 & -1 \\ 3 & 1 \end{bmatrix}\begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 3 \\ 4 \end{bmatrix}$ 　　　　　　 2) $x + 9y = 9$
　　　　　　　　　　　　　　　　　　　　　　 $3x + 6y = 6$

IV.   Pythagorean Theorem and Trigonometric Ratios (from Geometry)

A. Solve for the missing side of the triangle using the Pythagorean Theorem given right △ ABC:

1) a = 6 ft.   b = 8 ft.

a

c　　**b**

2) b = 17 ft.   c = 19 ft.
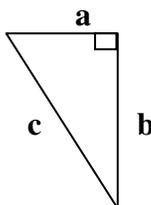
B. Solve for x and y using a 45-45-90 (ratio of sides $1:1:\sqrt{2}$) **or a 30-60-90 triangle** (ratio of sides $1:\sqrt{3}:2$)**.**

1)

2)

3)
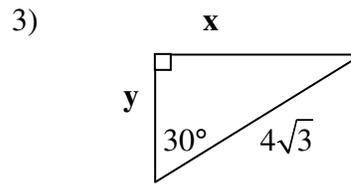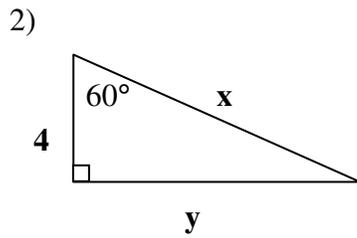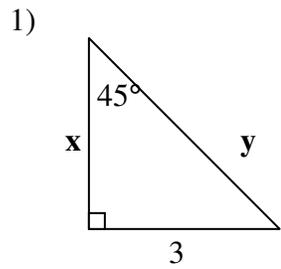
C. Given the right triangle, determine the trigonometric ratios.
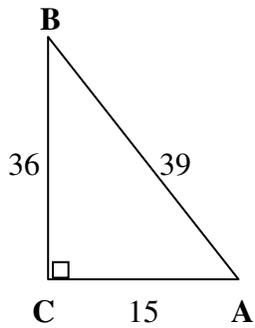
1) sin A   2) cos A   3) tan A

D. Use trig ratios to solve for x and y in each right triangle. Round answers to three places after the decimal point.

1)

2)
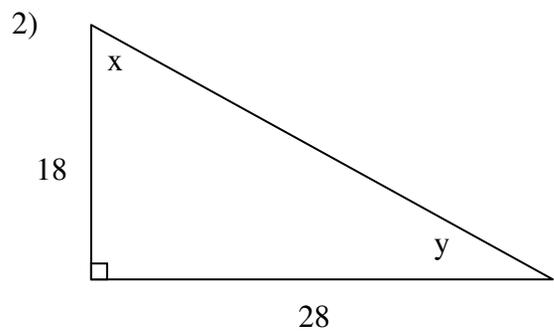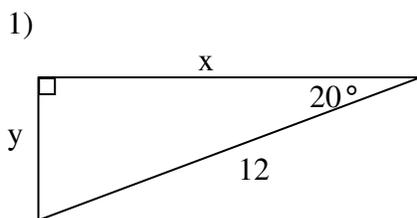
V. Statistics (from Algebra 1)

1) **Multiple choice** (choose the best answer)
Nathan is conducting a simulation concerning seniors who discuss their studies at home. He chooses to use a random number table with digits 0-9, where 0, 1, 2, 3 represent a senior who discusses studies at home and 4, 5, 6, 7, 8, 9 represents a senior who does not discuss studies. Based on this digit assignment, what is the probability that a senior discusses studies at home?

   A. 6%   **B.** 30%   **C.** 40%   **D.** 60%

2) A bubble gum machine has 50 gumballs inside. There are 22 red, 14 blue, 9 green, and 5 white gumballs. A child chooses one gumball at random.
   a. What is the probability that the gumball chosen is white?

   b. What is the probability that the gumball chosen is NOT green?

3) Which of the following sampling methods would provide a simple random sample of 50 college students?

   • Survey the first 50 students to enter the math building in the morning.
   • Obtain a list of alphabetized student names, and then select every 5th student
      on the list until there are 50 students selected.
   • Place the name of each student in a hat, and then draw 50 names.

Use the criteria for simple random sampling to justify your answer.

*4) Stephan bowled 160, 180, and 215 in his first three games.
   • What score would Stephan have to bowl in his fourth game for his 4-game
      average to be 180? Explain how you determined your answer. Use words,
      symbols, or both in your explanation.

*5) The table and box-and-whisker plot below shows the number of hours Suchita
worked each week at her summer job.

Number of Hours	Number of Weeks
1	1
7	2
20	2
22	1
24	2
25	1
26	3
	Total : 12

Hours worked by Suchita each week
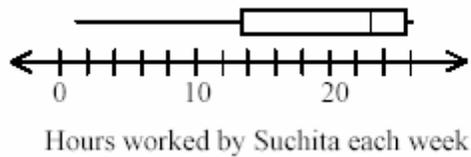
• Jeff looked at the box-and-whisker plot and concluded the number of weeks Suchita worked 19 hours or less was greater than the number of weeks she worked 23 hours or more. Is Jeff's conclusion correct? Use mathematics to justify your answer.

• Use the frequency table to find each measure of central tendency (mean/median/mode). Which measure best represents Suchita's typical work week? Use mathematics to justify your answer.

*6) Describe a model you could use to simulate a probability that 25% of all students go to the movies each week.

*7) Jose drives through three traffic lights each day. Each traffic light operates independently. Jose conducts a simulation to estimate the probability that two of the traffic lights will be red. Here are the results of the simulation.

Number of Red Traffic Lights	Frequency
0	5
1	7
2	3
3	0

Based on the results of the simulation, what is the probability that exactly two of the traffic lights will be red?