

PAINT BRANCH HIGH SCHOOL

MATH DEPARTMENT

Stat and Math Modeling (SAMM)

Pre-Requisite Packet

Instructions:

- SHOW ALL WORK that leads you to each solution in the space provided.
- You are permitted to use a calculator and notes from previous mathematics courses to help you, but you should do the work without any help from another person.
- All work needs to be completed and ready to turn in on the FIRST FRIDAY of school.
- This packet will count as part of your first quarter grade and there will be a QUIZ on the material.
- Additional copies of this packet may be printed from the PBHS website. www.paintbranchhighschool.org

Student Name: _____

ID#: _____ **Date:** _____ **Pd:** _____

Part 1 – Polynomials

1. Factor completely: $x^2 - 4x + 21$	2. Factor completely: $25x^2 - 49$
3. Simplify the following expression: $(8a^3b^2)^2(2a^4b^5)$	4. Simplify the following expression: $(39a^4 - 4a^3 + 2a^2 - a - 7) - (10a^4 + 3a^3 - 2a^2 - a + 8)$
5. Solve the following quadratic equation for x . $(2x+1)(x+3) = 0$	6. Solve the following quadratic equation for x . $x^2 = 16$

Part 2 – Linear Operations and Solving Equations.

Find the solution(s) of the given systems of equations. Write answers in the form (x, y)

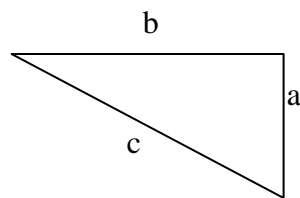
7. $\begin{aligned} 2x + 5y &= -7 \\ 7x + y &= -8 \end{aligned}$	8. $\begin{aligned} 4x + 9y &= 2 \\ 2x + 6y &= 1 \end{aligned}$
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Solve for x and y using Matrices.

9. $\begin{bmatrix} 4 & -1 \\ 3 & 1 \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 3 \\ 4 \end{bmatrix}$	10. $\begin{aligned} x + 9y &= 9 \\ 3x + 6y &= 6 \end{aligned}$
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Part 3 – Geometry Review

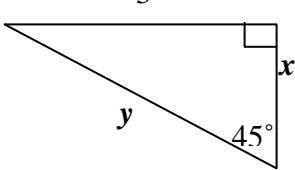
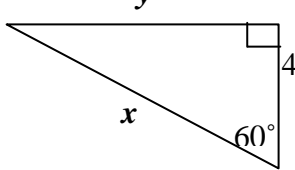
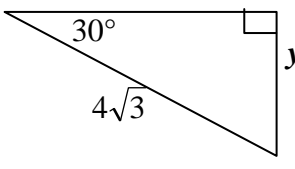
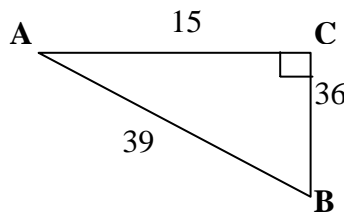
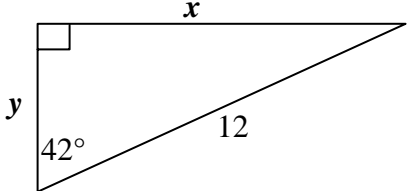
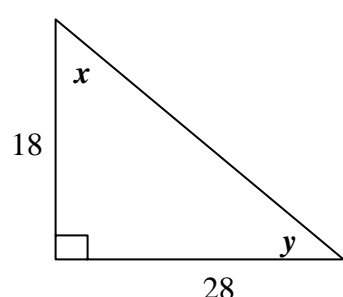
Use Pythagorean Theorem: $a^2 + b^2 = c^2$ to find the values of the missing sides of a right triangle.



11. $a = 6$ $b = 8$	12. $b = 17$ $c = 19$
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For problems 13-15, solve for x and y using a 45-45-90 triangle ratio of sides (1: 1: 2) or a 30-60-90 triangle ratio of sides (1: $\sqrt{3}$: 2).

Note: Figures not drawn to scale

<p>13.</p> 	<p>14.</p> 
<p>15.</p> 	<p>16. Given the right triangle, determine the trigonometric ratios.</p>  <p>a) $\sin A$ _____ b) $\cos A$ _____ c) $\tan A$ _____</p>
<p>Use trig ratios to solve for x and y in the right triangle. Round answers to three decimal places.17.</p>  <p>$x =$ _____ $y =$ _____</p>	<p>18. Use trig ratios to solve for x and y in the right triangle. Round answers to three decimal places.</p>  <p>$x =$ _____ $y =$ _____</p>

Part 4 – Statistics (from Algebra 1)

19. **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 represent a senior who discusses studies at home and 3, 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. 3% B. 30% C. 40% D. 60%

20. 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? _____

21. 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.
