Advanced Math Functions and Statistics Summer Assignment   Name_____

DUE: August 8, 2022

This assignment is for students who have completed Algebra II or Advanced Math and are taking Advanced Math Functions and Statistics in the 2022-2023 school year.

Did you read the instructions? _____

What math are you taking in the 2022-2023 school year? _____

The expectation of the Math Department at Archbishop Hannan High School is that its students become Tenacious Problem Solvers! Thus, as you work on these problems be sure and document your strategies, your mathematical explanations, any drawings, tables or graphs that you use, and the best, complete answer you can find. We hope that you are challenged by these problems and enjoy them. We look forward to the discussion of these problems that we will have in the first weeks of school. Come prepared to defend your solution!

Use of a graphing calculator is expected to solve these problems (unless stated otherwise). However, you must document your work in writing. For example, the solution to question 2a is found by performing the following calculation: $h(0) = 400 - 16(0)^2 = 400$. You must write that whole equation, not just 400 feet. Round to the nearest hundredth when necessary and always include units of measure when appropriate.

1. On each of the following number lines, all of the labeled points are evenly spaced. Find *coordinates* for the seven points designated by the letters:
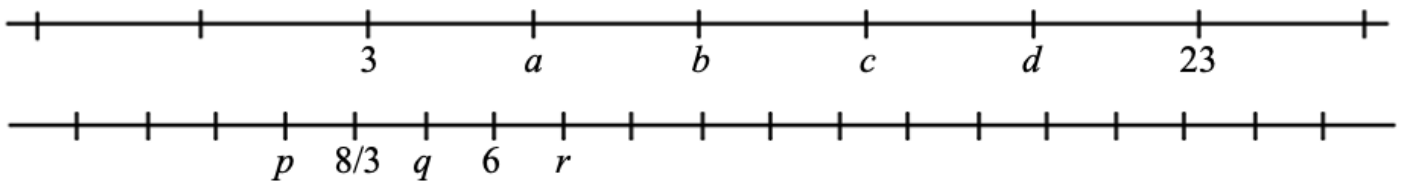
2. After being dropped from the top of a tall building, the height of an object is described by $h(t) = 400 - 16t^2$, where h is measured in feet and t is measured in seconds.
a) How tall is the building?

b) How long does it take to reach the ground?

c) How high is the object when t = 2 seconds?

3. Often it is necessary to rearrange an equation so that one variable is expressed in terms of others. For example, the equation $D = 3t$ expresses D in terms of t. To express t in terms of D, divide both sides of this equation by 3 to obtain $\frac{D}{3} = t$.

a) Solve the equation $C = 2\pi r$ for r in terms of C.

b) Solve the equation $p = 2w + 2h$ for w in terms of p and h.

c) Solve the equation $3x - 2y = 6$ for y in terms of x.

4. A team has started its season badly, winning 1 game, losing 6 and tying none. The team will plan a total of 25 games this season. Round all answers to the nearest percent.

a) What percentage of the seven games played so far have been wins?

b) Starting with its current record of 1 win and 6 losses, what will the cumulative winning percentage be if the team wins the next 4 games in a row?

c) Starting with its current record of 1 win and 6 losses, how many games in a row must the team win in order for its cumulative winning percentage to reach at least 60%?

d) Suppose that the team wins ten of its remaining 18 games. What is its final winning percentage?

e) How many of the remaining 18 games does the team need to win so that its final winning percentage is at least 60%? Is it possible for the team to have a final winning percentage of 80%? Explain your answer.

Essential Skills

The following problems represent the essential skills you need to be successful in Advanced Math Functions and Statistics.

Solve each equation. Round to the nearest tenth when necessary. SHOW WORK!!!

1) $5(1 + 4p) + 2 = 167$

2) $\left|8 + n\right| = 15$

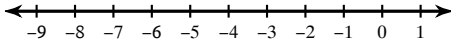3) $2a^2 + 7 = 205$

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

5) $6k^2 = 8 + 10k$

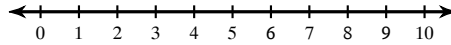6) $\sqrt{3r - 19} = \sqrt{9 - r}$

7) $e^x = 93$

8) $\log\left(3m + 2\right) = \log\left(4m - 3\right)$

Solve each inequality and graph its solution.

9) $100 \geq -2(7n - 1)$

10) $84 > 6(x + 6)$

Simplify. Your answer should contain only positive exponents.

11) $x^2 \cdot \left(y^2\right)^2$

12) $3y^{-1} \cdot 3x^{-2}y^3$

13) $\dfrac{2ab^4}{b^4}$
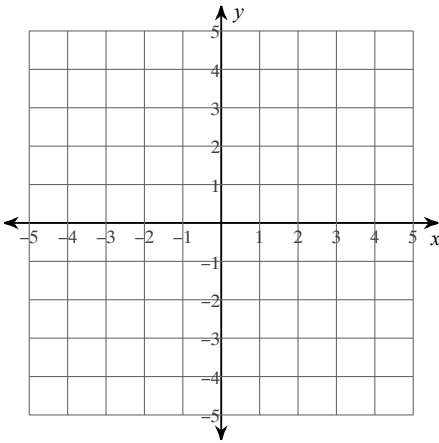
14) $\left(\dfrac{2y}{2x^4y^2 \cdot y}\right)^2$

Write the slope-intercept form of the equation of the line through the given points.

15) through: $(5, -5)$ and $(0, -2)$
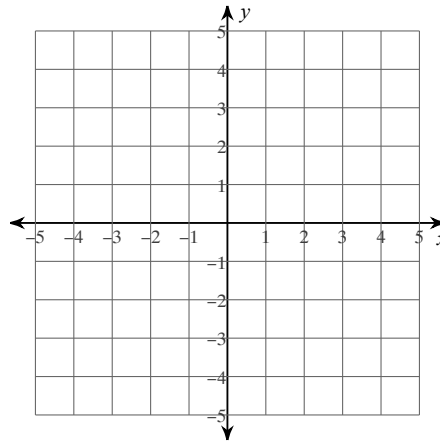
Solve each system by graphing.

16) $y = -\dfrac{1}{4}x - 2$

$\ y = -\dfrac{1}{4}x + 1$

17) $y = \dfrac{2}{3}x + 1$

$\ y = -\dfrac{1}{3}x + 4$

Solve each system.

18) $x + 4y = 22$
$\ -3x + 6y = 6$

19) $-3x + 9y = -30$
$\ -6x + y = 8$

Simplify each expression.

20) $\left(4p - 4p^4 + 3p^3\right) + \left(5p - 2p^3 - 7p^4\right)$

21) $\left(2x + 8 - 2x^3\right) - \left(8 - 5x^3 - 3x\right)$

Find each product.

22) $(8a + 2)(a - 7)$

23) $(6m - 4)^2$

Factor each completely.

24) $5p^3 - 25p^2 - 120p$

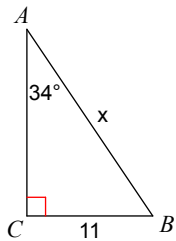25) $n^2 - 100$

26) $2n^2 - 15n + 25$

27) $7k^3 - k^2 - 6k$

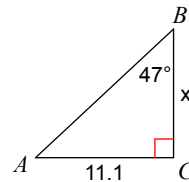28) $9b^4 + 24b^3 + 16b^2$

29) $8v^2 - 72v$

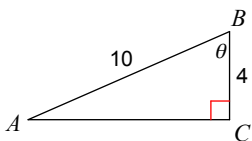**Find the measure of each side indicated. Round to the nearest tenth.**

30)

31)

Find the measure of each angle indicated. Round to the nearest degree.

32)

33)