Name _____ Date _____ Semester _____

SUMMER PACKET

Accelerated Trig/Precalc

2023-2024

Teacher: ***Mrs. Miller***
Email: emiller2@gasd-pa.org

Welcome to Accelerated Trigonometry/Precalculus!

I. The problems in this packet are designed to help review the topics from previous mathematics courses that are important to your success in Accelerated Trigonometry/Precalculus. Please complete each problem, as they are topics you will need to know for this course. **Be sure to show all work on additional sheets of paper or you will not receive full credit for completing the packet.**

II. Online resources you may use include, but are not limited to:
   a. http://www.purplemath.com
   b. http://www.mathforum.org/dr.math/

   Check out http://www.khanacademy.org for videos that help review specific topics.

III. You may email equations to your teacher. Email will be checked weekly over the summer.

IV. Pacing:

	Fall Semester	**Spring Semester**
Pages #1-2	End of June	End of November
Pages #3-4	End of July	End of December
Graphic Organizer	Before 1st day of school	Before 1st day of 2nd semester

V. **Bring the completed summer packet with you on the first day of class. The packet will be given credit on that day. Within the first week of the semester, a test will be given on the material from the packet. Be prepared!**

VI. Complete the attached graphic organizer, recalling the important information you learned about these concepts in Algebra 2.

VII. All math courses at the high school require the use of a graphing calculator. The teacher will model the use of the TI-83, TI-83+, TI-84, or TI-84+ model. You are free to purchase from a different company or a different model; however, you will need to know how to use the calculator you choose.

Name: _____

Accelerated Trig/Precalc: Summer Assignment Graphic Organizer

In the boxes below, fill in all relevant information you remember concerning these important topics from Acc. Algebra 2.

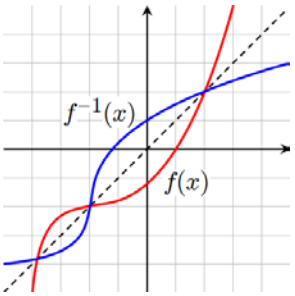
Characteristics of Functions

Function	Not a Function
(4,12)	(4,12)
(5,15)	(4,15)
(6,18)	(5,18)
(7,21)	(5,21)
(8,24)	(6,24)

Operations with Functions

Transformations

INVERSES



Regression

SHORT ANSWER. Show all work for credit.

1) $a^2 + ab + b^2$, if $a = -3$ and $b = 2$ 1) _____

Simplify the following.

2) $5(2x + y - 1) - 4(y - 3x + 2) + 1$ 2) _____

3) $(3x - 4)^2$ 3) _____

Factor the following completely:

4) $25x^2 - 20x + 4$ 4) _____

5) $15x^3 - 22x^2 + 8x$ 5) _____

6) $y^4 - 13y^2 + 36$ 6) _____

7) $3x^2 - 27y^2$ 7) _____

8) $x^3 + 27$ 8) _____

Find which values of x are solutions.

9) $\sqrt{4 - x^2} + 3 = 5$ 9) _____

(a) $x = 2$ (b) $x = -2$ (c) $x = 0$

Solve the equation.

10) $\frac{1}{5}(10x - 25) = \frac{1}{2}(10x - 4)$ 10) _____

11) $\frac{x + 7}{8} = \frac{x + 8}{9}$ 11) _____

12) $\frac{7x + 7}{5} + \frac{6x - 2}{2} = -1$ 12) _____

Solve the equation graphically by finding x-intercepts on the graphing calculator. Round to two decimal places, if necessary.

13) $x^2 - x - 3 = 0$ 13) _____

14) $x^3 + 3x^2 + 3x + -1 = 0$ 14) _____

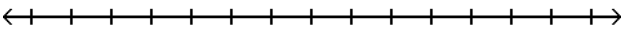
Solve the equation graphically by finding the intersection(s) on the graphing calculator. Round to two decimal places, if necessary.

15) $2x^2 = -11x - 2$ 15) _____

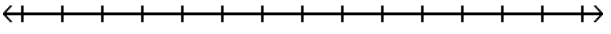
16) $|x - 1| = 14x + 4$ 16) _____

Solve the inequality and draw a number line graph of the solution. Express the solution set in interval notation.

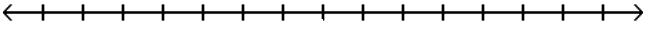
17) $1 > \frac{4z + 1}{7} > -1$ 17) _____



18) $2x - 1 < -5$ or $3x + 2 \geq 5$ 18) _____



19) $\frac{2y - 3}{3} + \frac{3y + 1}{5} \leq y + 1$ 19) _____



SHORT ANSWER. Show all work for credit.

Determine whether the equation is linear.

1) $28 + 146x = 102x$ 1) _____

2) $x^2 + 8x = x^3 + 9$ 2) _____

Find the slope of the line through the pair of points.

3) (-7, -4) and (-7, -2) 3) _____

Identity the slope and y-intercept. Leave values in fractional form, if appropriate.

4) $\frac{1}{3}x + \frac{1}{4}y = 2$ 4) _____

Find a slope-intercept form equation for the line. Express answers with fractions, not decimals, where appropriate.

5) Through (0, 5), with slope $\frac{4}{7}$ 5) _____

6) Through the points (3, 5) and (-3, 9) 6) _____

Solve the problem.

7) Suppose the sales of a particular brand of appliance satisfy the relationship $S(x) = 240x + 3700$, where $S(x)$ represents the number of sales in year x, with $x = 0$ corresponding to 1982. Find the number of sales in 1989. 7) _____

8) Americans' personal consumption expenditures in trillions of dollars in years since 1998 is shown in the table. 8) _____

x	0	1	2	3	4	5
y	5.9	6.3	6.7	7.0	7.4	7.8

a. Create a scatterplot of the data using your graphing calculator.

b. Run a linear regression and paste the regression model in your y_1. Is this a good model to fit the data? Justify your answer.

c. Using your calculator, estimate Americans' expenditures in the year 2004.

d. Using your calculator, predict when Americans' expenditures will be 8.8 trillion. Round to the nearest year.

If $f(x) = 2x + 3$, $g(x) = \frac{1}{3}(4 - x)$, and $h(x) = \frac{1}{2}x - \frac{5}{3}$, find the following:

9) $(f + g)(x)$ 9) _____

10) $(h - g)(x)$ 10) _____

11) $-4(f \cdot g)(x)$ 11) _____

12) $\left(\frac{f}{g}\right)(x)$ and state the excluded value 12) _____

Perform the requested operation or operations if $f(x) = \frac{x - 5}{8}$; $g(x) = 8x + 5$

13) Find f(g(x)) and f(g(-4)). 13) _____

14) Find g(f(x)) and g(f(0)). 14) _____

15) Find f(f(x)) and $\left(f\left(f\left(\frac{1}{2}\right)\right)\right)$. 15) _____

16) Find $g^{-1}(x)$ if $g(x) = \frac{1}{4}(6 - x)$. 16) _____

SHORT ANSWER. Show all work for credit.

Solve the equation by factoring. Express your answers as fractions, if necessary.

1) $6x^2 - 29x = 5$ 1) _____

Solve the equation using the Square Root Property. Be sure to exress your answer with a simplified radical, if necessary.

2) $2(x - 2)^2 = 3$ 2) _____

Solve by completing the square. Be sure to exress your answer with a simplified radical, if necessary.

3) $x^2 + 14x + 48 = 0$ 3) _____

Solve the equation using the quadratic formula. Be sure to exress your answer with a simplified radical, if necessary.

4) $x^2 - 12x + 45 = 0$ 4) _____

Solve the inequality. Use algebra to solve the corresponding equation. Express the solution set in interval notation.

5) $x^2 + 4x - 5 \geq 0$ 5) _____

6) $x^2 + 3x \leq 4$ 6) _____

Solve each problem below. Show all work. Express answers in an exact, simplified form as well as a decimal approximation to two decimal places.

7) The number of mosquitoes M(x), in millions, in a certain area depends on the June rainfall x, in inches: $M(x) = 12x - x^2$. What rainfall produces the maximum number of mosquitoes? 7) _____

8) A projectile is thrown upward so that its distance above the ground after t seconds is $h = -12t^2 + 336t$. What is the maximum height? 8) _____

9) A rock falls from a tower that is 400 ft high. As it is falling, its height is given by the formula $h = 400 - 16t^2$. How many seconds will it take for the rock to hit the ground (h=0)? 9) _____

SHORT ANSWER. Show all work for credit.

1) Find the following characteristics for the polynomial function listed below: 1) _____

Domain
Range
Increasing/Decreasing behavior
Boundedness
Even/Odd using Algebra
End behavior
List of possible rational roots using the Rational Root Theorem
Find the exact roots using Algebra. Express in a simplified form, as well as decimal approximations rounded to two decimal places.

a. $f(x) = 10x - x^3 - x^2 - 8$

Solve the inequality using algebra. Express the solution set in interval notation.

2) $3x^3 > 48x$ 2) _____

3) The graph of $y = -9x^3 + 2$ can be obtained from the graph of $y = x^3$ by vertically stretching by a factor of _____; reflecting across the_____ -axis, and shifting vertically _____ units in the _____ direction. 3) _____

Find the inverse.

4) $f(x) = 5x^3 - 3$ 4) _____

Prove that f(x) and g(x) are inverses using compositions.

5) $f(x) = -4x^5 + 10$ 5) _____
$g(x) = \sqrt[5]{\frac{5}{2} - \frac{1}{4}x}$

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Solve the problem.

6) 6) _____

# of cases of donuts made	10	20	30	40	50	60	70	80	90
Profit (in dollars)	868	1790	1990	2450	2490	2390	2220	1320	1000

on the graphing calculator. of the following functions would be the best regression for modeling

A) Cubic B) Linear C) Quadratic

7) Using the model you selected above, predict the profit if 75 cases of donuts were made. 7) _____

A) $1856.59 B) $1825.20 C) $1815.25

SHORT ANSWER. Show all work for credit.

8) Identify the following characteristics for the rational function below. Show any necessary work to support your answers. 8) _____

Vertical asymptotes
Holes (list as an ordered pair)
X-intercepts
Y-intercept
Horizontal asymptotes
Diagonal asymptotes
Domain
Range

a. $f(x) = \frac{x+1}{2x^2 - x - 3}$

Find the inverse of the function.

9) $f(x) = \frac{3x + 7}{9x - 6}$ 9) _____

Simplify the following.

10) $\frac{2}{3y} + \frac{3}{y}$ 10) _____

11) $\frac{x}{x - 1} + \frac{x + 1}{3x - 4}$ 11) _____

12) $\frac{\frac{x^2}{9x^2 - 4y^2}}{\frac{x^3}{2y - 3x}}$ 12) _____

13) $\frac{x + 12}{4x - 16} - \frac{x + 4}{2x - 8}$ 13) _____