Hello and Welcome to Calculus!

I hope you are finishing up your last couple of assignments and getting ready for summer. I know this year hasn't been quite what we expected and I know I'm ready for a new year. I am so excited to have you again in Calculus and I hope you're excited as well.

This summer, I wanted to provide an assignment that will focus on the review from Pre-Calculus, so we can begin the year by diving into Calculus topics as early as possible. The attached packet has many problems that are a good review of four big topics from Pre-Calculus that are directly related to topics in Calculus (see topic breakdown on the next page). You should be familiar with these and worked with them in previous years. If you don't remember them or you're struggling with these practice problems there's some great tools and videos on Khan Academy you can look at (email me if you would like the link).

The amount of work you put into this packet is up to you - I will not be collecting it and giving you a grade on it. We will spend a little time the first week of school going over these types of problems, completing some additional practice where needed. You will have a test on these topics shortly after that which will count as your first grade for the year. You know my grading policy from last year - you will have the opportunity to retake it for an improved grade; however, as a class we will be moving forward. In order to best prepare you for the AP Calculus exam, and future math classes, we have to get through a significant amount of material that can only be possible if we move through the review quickly. Work on what you need to work on to make sure this first test is successful, but don't waste your time on something you already know.

I'm excited for our class next year and hope you have a wonderful summer!

Miss Sobanski

Calculus AB - Chapter P: Preparation for Calculus: Review

Part 1: Manipulating Expressions

A. Solving Linear Equations
B. Polynomial Expressions
C. Quadratics
D. Properties of Exponents
E. Logarithms

Part 2: Functions

A. Definition/Terminology
B. Representing Functions with Graphs/Types of Functions
C. Manipulating Functions

Part 3: Geometry

A. Area of Shapes
B. Volume of 3D shapes
C. Cross Section of 3D Shapes
D. Analytical Geometry

Part 4: Trigonometry

A. Basic Trig Functions
B. Using the Unit Circle
C. Manipulating Trig Functions

Chapter P - Part 1: Manipulating Expressions

Date_____

Simplify.

1) $(v^3 + v^2 - 8v - 13) \div (v + 2)$

2) $(5x + 8)(-3x + 7)$

Solve each equation.

3) $2x^2 + 4 = 54$

4) $x^2 + 7x = -12$

5) $8v^2 + 10v = -4$

6) $3r^2 = -7 + 7r$

Find the value that completes the square and then rewrite as a perfect square.

7) $m^2 - 17m + \_\_$

8) $x^2 + 17x + \_\_$

Solve each equation by completing the square.

9) $x^2 + 14x + 31 = 7$

10) $x^2 - 14x + 29 = -4$

Simplify. Your answer should contain only positive exponents.

11) $\dfrac{2x^3}{\left(xy^{-3}\right)^3 \cdot \left(x^4y^2\right)^{-4}}$

12) $\left(\dfrac{2xy^{-4} \cdot yx^{-4}}{\left(yx^{-3}\right)^{-2}}\right)^{-3}$

Write each expression in the opposite form.

13) $(10v)^{\frac{6}{5}}$

14) $\left(\sqrt[5]{10p}\right)^7$

Use properties of Logarithms.

15) $y = \log_x 5$

16) $y = \log_6 (2x)$

17) $\log_7 \left(\frac{3}{11^5}\right)^5$

18) $\log_8 \left(10 \cdot 7 \cdot 3^5\right)$

19) $2\log_6 2 - 8\log_6 3$

20) $3\log_4 x - 9\log_4 y$

21) $\log_3 81$

22) $\log_3 27$

Solve each equation. Round your answers to the nearest ten-thousandth.

23) $8^{x-7.2} = 28$

24) $12^{-2b} = 13.8$

25) $\log_{12}(8 - p) = 0$

26) $\log_{12} 6m = 1$

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Chapter P - Part 2: Functions

Date_____ Period____

Definition/Terminology:

1) Name two ways you can determine if a graph represents a function.

2) Domain:

Range:

Even function:

Odd function:

Intercepts:

Find the inverse of each function.

3) $f(x) = -\frac{2}{x-1} - 3$

4) $g(x) = x^3 - 3$

Determine the domain and range of each function. Then state if the function is even or odd.

5) $f(x) = 2\cos x$

6) $f(x) = \sqrt{x - 5}$

7) $f(x) = |x + 9| - 3$

8) $f(x) = \dfrac{2x - 5}{x}$

Perform the indicated operation for the following functions:

$$f(x) = 4x + 3$$
$$g(x) = x^2 + 4x$$

9) Find $f(5)$

10) Find $g(a + 3)$

11) Find $g(f(x))$

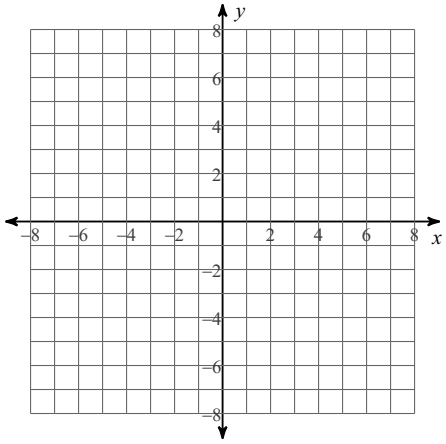
12) Find $\dfrac{f(x + h) - f(x)}{h}$

13) Find $f(x) + g(x)$

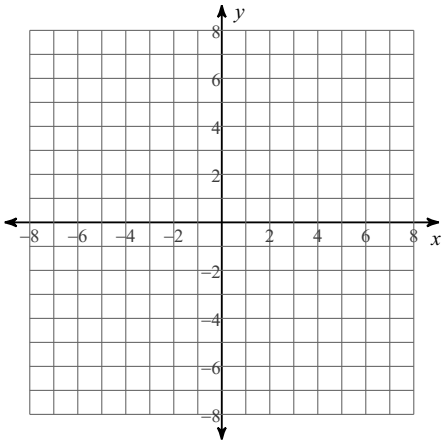
14) Find $g(x) - f(x)$

Sketch the graph of each function.

15) $g(x) = (2(x-1))^2 - 1$

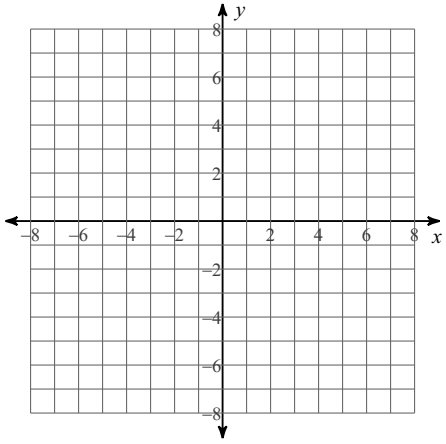


16) $g(x) = -|x-2| - 3$

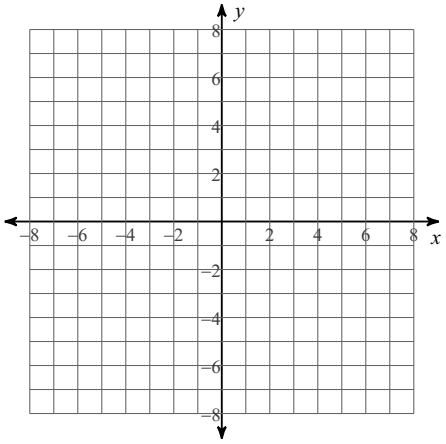


Sketch the graph of each function. Then evaluate at $f(2)$, $f(-5)$ and $f(f(1))$

17) $w(x) = \begin{cases} -x-3, & x \le -3 \\ 4-x^2, & x > -3 \end{cases}$

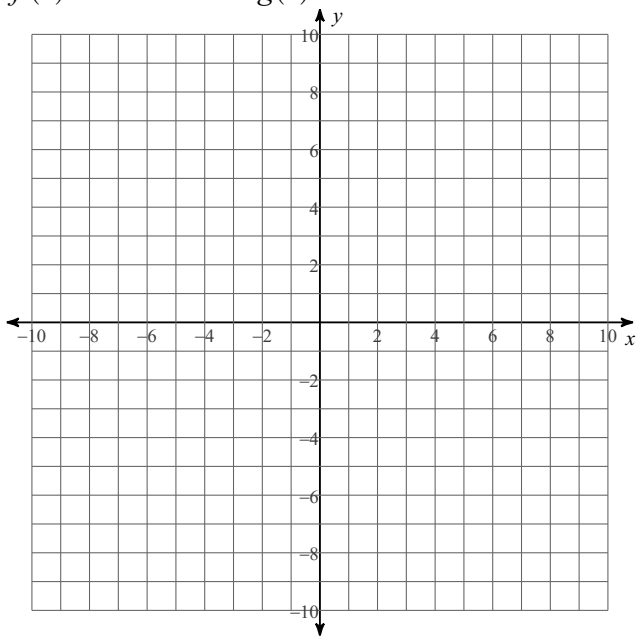


18) $f(x) = \begin{cases} 3^x - 2, & x < -4 \\ |x| + 2, & -4 \le x < 2 \\ (x-3)^2, & x \ge 2 \end{cases}$



Given the two functions, graph, determine all zeros and list all intersections.

19) $f(x) = 3x^2 - 4$ and $g(x) = \sqrt{x + 3} + 2$



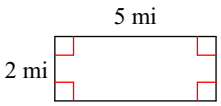
Calculus AB Name_____ ID: 1

Chapter P - Part 3: Geometry

Date_____ Period____

Find the area of each. Round your answer to the nearest tenth.

1)



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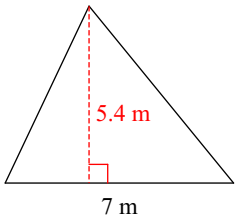

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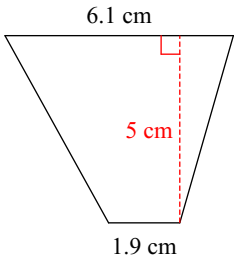

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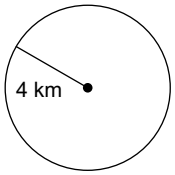
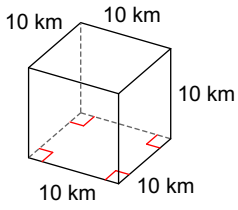


Find the volume of each figure. Round your answers to the nearest hundredth, if necessary.

5)



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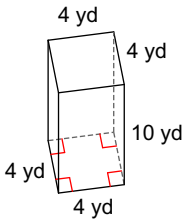

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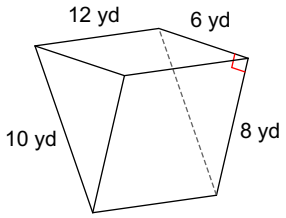

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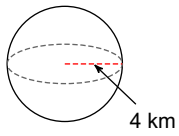
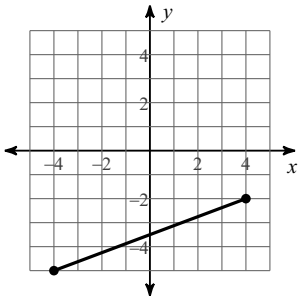


Find the midpoint of each line segment.

9)



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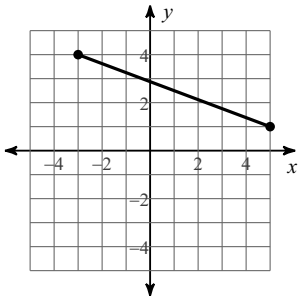
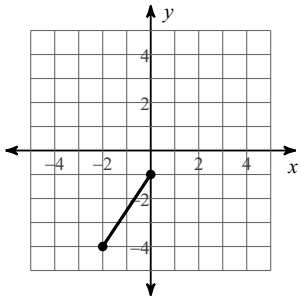


Find the distance between each pair of points.

11)



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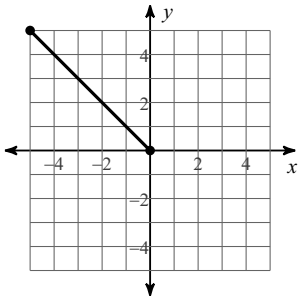


Find the slope of a line parallel to each given line.

13) $y = \frac{7}{5}x + 5$

14) $y = \frac{1}{2}x - 3$

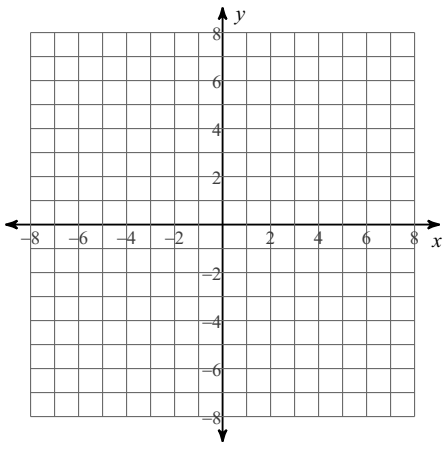
Find the slope of a line perpendicular to each given line.

15) $x = -3$

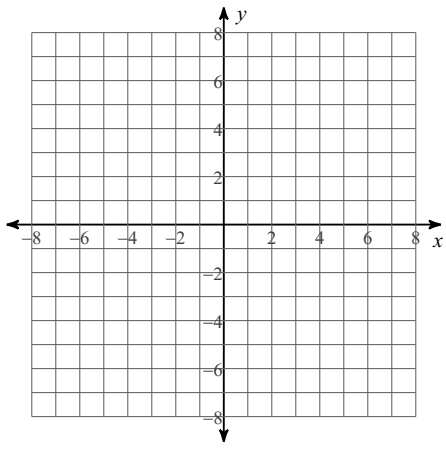
16) $y = 2x + 1$

Identify the center and radius of each. Then sketch the graph.

17) $\left(x - 2\sqrt{3}\right)^2 + \left(y - \frac{5}{2}\right)^2 = 9$



18) $\left(x + \frac{3}{2}\right)^2 + (y + 1)^2 = 20$



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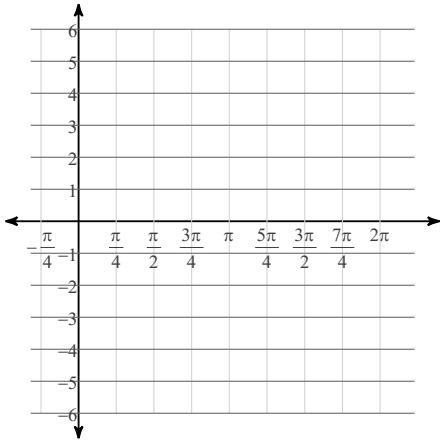
Chapter P - Part 4: Trigonometry

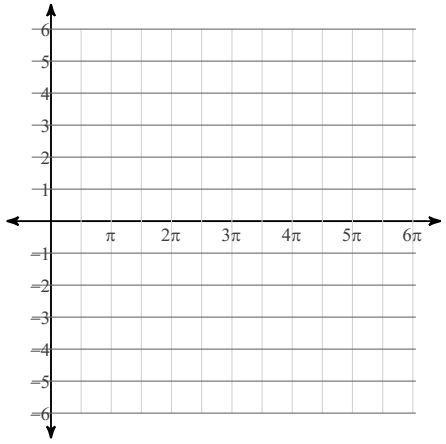
Date_____ Period____

Find the amplitude, the period in radians, the phase shift in radians, and the vertical shift. Then sketch the graph using radians.

1) $y = \frac{1}{2} \cdot \cos\left(3\theta - \frac{3\pi}{4}\right) + 2$



2) $y = -2 + 2\cos\left(\frac{\theta}{2} - \frac{\pi}{4}\right)$



Find the amplitude, the period in radians, the phase shift in radians, and the vertical shift.

3) Amplitude: $\frac{1}{6}$

Period: $\frac{\pi}{2}$

Phase shift: Left $\frac{\pi}{6}$

Vert. shift: 2

4) Amplitude: 8

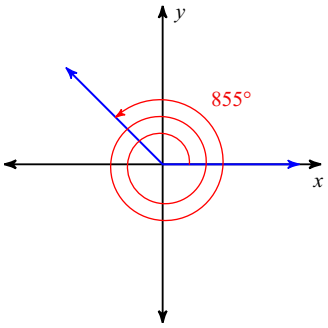
Period: π

Phase shift: Left $\frac{2\pi}{3}$

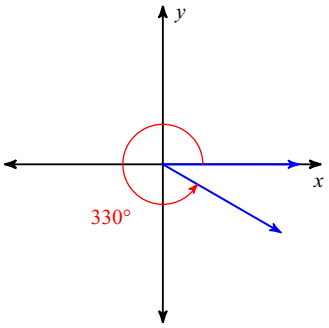
Vert. shift: -3

Find the exact value of each trigonometric function.

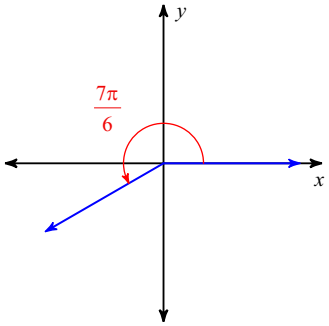
5) sin θ



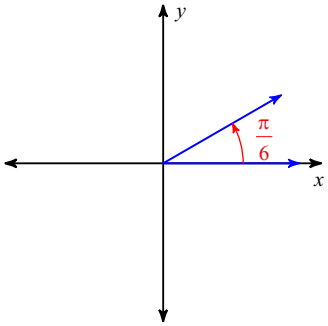
6) sin θ



7) tan θ



8) cos θ



Solve each equation for $0 \le \theta < 2\pi$.

9) $-5 + \cos\theta = \dfrac{-10 - \sqrt{3}}{2}$

10) $-1 + \cos\theta = \dfrac{-2 - \sqrt{2}}{2}$

Verify each identity.

11) $\dfrac{\sin x}{\sec^2 x} = \dfrac{\cos^2 x}{\csc x}$

12) $\sec^2 x + \cot^2 x = \tan^2 x + \csc^2 x$

13) $\dfrac{\tan^2 x + 1}{\cot^2 x} = \tan^2 x \sec^2 x$

14) $\cot x \csc x + 1 = \dfrac{\sin^2 x + \cos x}{\sin^2 x}$