Name: _____
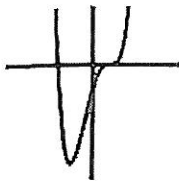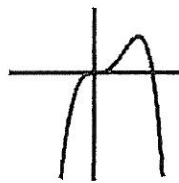
Due Date: Sep. 2019

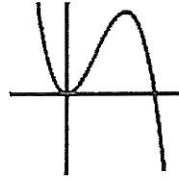1. Match each equation with its appropriate graph. Hint: Use end-behaviors and x-intercepts.

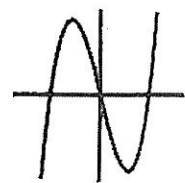   A   B   C   D

_____ $y = 2x^3 - x^4$

_____ $y = (x+2)(x-1)^3$

_____ $y = -x^3 + 3x^2$

_____ $y = \dfrac{1}{2}x^3 - 4x$

2. The graph of $y = f(x)$ is shown. Match each graph with its equation.

$y = f(x)$

   I   II

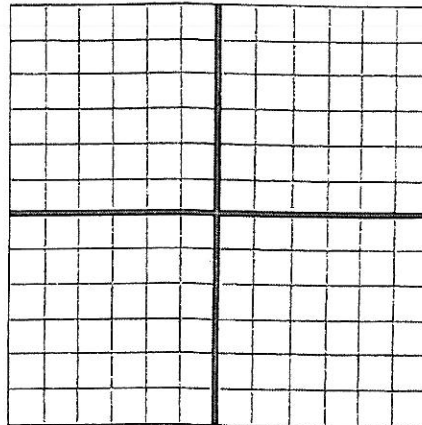_____   _____

A) $y = -f(x)$ B) $y = f(-x)$ C) $y = f(x) - 2$ D) $y = f(x+2)$

3. Find the maximum value and the zeros of the function algebraically, then sketch the function.

$f(x) = x^2 - 6x + 5$

Minimum value is _____.
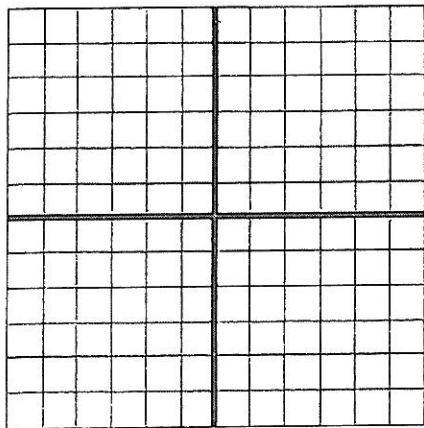
The minimum occurs when $x =$ _____.

Zeros _____

4. Let $f(x) = 2x^2$, $g(x) = 2x + 4$, and $h(x) = \dfrac{x}{2}$. Find each of the following:

a) $h(f(x)):$_____

b) $f(g(x)):$_____

5. Let $f(x) = \frac{1}{2}x - 1$.

    a) Find the inverse function $f^{-1}(x)$:_____

    b) Sketch the graphs of f and f^{-1}.

6. Simplify using powers of the same base.

$$\frac{9^{2n} \cdot 27^n}{3^{-n}}$$

_____

Simplify

7. $(2^{-2} + 4^{-2})^{-1}$

_____

13.   Solve: $2^{8-x} = 4^{1+x}$

_____

14. Suppose that $1200 is invested at an interest rate of 3.5%. How much is the investment worth after 18 months if interest is compounded quarterly?
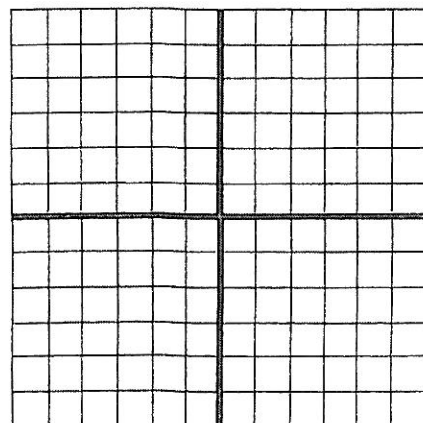
_____

15. Give the domain, range and zeros for the function:
$$f(x) = |x + 4|$$

Domain:_____

Range:_____

Zeros:_____
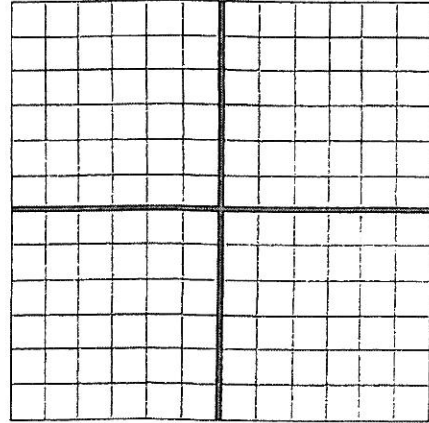
16. Graph the function $f(x) = 2^{-x}$. Identify at least three points that lie on the curve. Include these in your graph.

(____ , ____)

(____ , ____)

(____ , ____)

Factor each of the following. Be careful, there will be no partial credit.

17. $a^2 - 18a + 81$ _____

18. $16x^2 - 9y^2$ _____

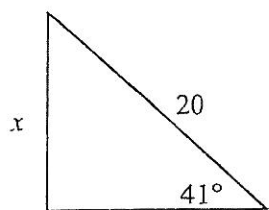19. $x^3 - x^2 + 2x - 2$ _____

20. $x^3 - 8$ _____

Simplify each of the following. All radicals must be in simplest form. There will be no partial credit.
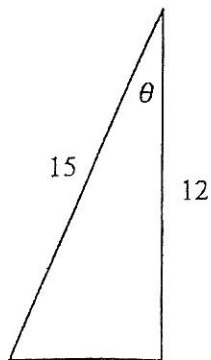
21. $\dfrac{15}{\sqrt{75}}$

22. $\dfrac{1-\sqrt{3}}{1+\sqrt{3}}$

_____   _____

Assuming the following figures are right triangles, solve for the indicated side or angle.

23.

24.

_____   _____

PRECALCULUS PREREQUISITES

PRECALCULUS builds on previous mathematical learning. Below are six key themes, along with subtopics, which are essential prerequisite learning for Precalculus. Prior learning will be spiraled during the year in Precalculus, but an overall understanding of the below six themes will maximize your chances of success in Precalculus.

A sampling of prerequisite problems is included in this packet. The Prerequisite Assessment will consist of problems, which cover the main ideas of the problems in this packet. The Prerequisite Assessment will be on the third day of class and be weighed as a quiz in Marking Period 1. The first two days of class will be devoted to review with ample time for question and answer periods. Please bring your completed packet with you on the first day of school to make the review as successful as possible for you.

1. RENAMING EXPRESSIONS: base ten number system; arithmetic with decimals, fractions, signed numbers; set notation (interval, set-builder, union, intersection); basic vocabulary (e.g., the phrases "at least" and "at most," nonnegative, integers, consecutive); percent; unit conversion; scientific notation; factoring; radicals; exponent laws; polynomials; matrices; complex numbers; completing the square technique; long division of polynomials; logarithms.

2. SOLVING EQUATIONS AND INEQUALITIES IN ONE VARIABLE: linear; quadratic; absolute value; exponential; logarithmic; radical; systems; rational; compound inequalities; the zero factor law. Understand extraneous solutions, and when they can arise. Be sure that you can distinguish between exact and approximate solutions. You should understand the relationship between the algebraic and graphical solutions of sentences. You must be able to factor.

3. GRAPHING SENTENCES IN TWO VARIABLES: familiarity with these "basic models": $y = x$, $y = x^2$, $y = x^3$, $y = |x|$, $y = \sqrt{x}$, $y = 1\,x$, $y = k$, $y = \ln x$ (and other bases), $y = ex$ (and other bases). Be able to graph circles and lines. Be able to graph transformations of the "basic models" involving: horizontal and vertical translations; vertical scaling; reflection about the x-axis; absolute value transformation. Be able to handle compound sentences that use the mathematical words 'and' and 'or.'

4. BASIC GEOMETRY FORMULAS: perimeters of common figures, including the circumference of a circle. Also know the following formulas: AREA: rectangle, triangle, circle, trapezoid VOLUME: right cylinder (with familiar base)

5. FUNCTIONS: function notation; domain and range; composition; piecewise-defined functions; quadratic ($y = ax^2 + bx + c$ and $y = a(x-h)^2 + k$ forms); higher-order polynomial (relationship between the zeros and factors); exponential and logarithmic (allowable bases, shapes of graphs); rational (asymptotes, end behavior, puncture points); periodic (sine and cosine).

6. CALCULATOR SKILLS: change the mode in your calculator as needed. Key in expressions using correct knowledge of order of operations. Graph functions: set the window; trace along a curve; find maxima/minima of graphs; find x-intercepts using the built-in calculator feature; use the table feature; use the Zoom In, Zoom Out, and Zoom Box features; find intersection points of graphs.

If you are deficient in any of these skills, please seek additional help before the start of the year for a more seamless transition into this course.