

**Purpose:** Review and enhance student understanding of Algebra II concepts that are pre-requisites for Precalculus.

**Instructions & Grading:** Complete all questions in this packet. Show all work for each question to demonstrate your understanding of the concepts and to earn full credit for this assignment. The questions are graded based on completeness not accuracy. The packet counts as 2 homework assignments.

**This packet is due on the first day of class in September. An answer key will be available on the first day of class. There will be a QUIZ on this material the second week of school.**

Students will need a **TI-84 Plus CE graphing calculator** for this course. In class, all demonstrations of calculator skills will be on this calculator. Students will **NOT** be able to use a graphing calculator that can download documents from computers such as the TI-nspire CX or any graphing calculator that says CAS (Computer algebra system).

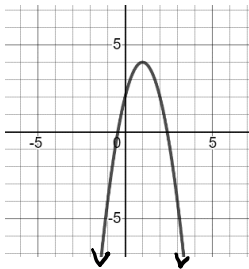
**Students can use their Algebra 2 textbook/notes and the text for this course, PreCalculus with Limits A Graphing Approach 8<sup>th</sup> edition by Ron Larson and Paul Battaglia, as resources.**

1. Represent the following inequalities using interval notation:

a)  $-2 < x \leq 5$

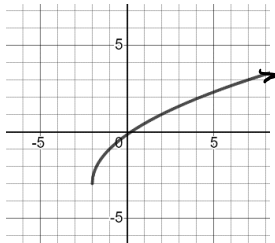
b)  $x \geq -3$

2. Given the graphs, state the domain and range in interval notation.



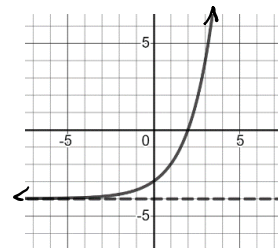
Domain: \_\_\_\_\_

Range: \_\_\_\_\_



Domain: \_\_\_\_\_

Range: \_\_\_\_\_



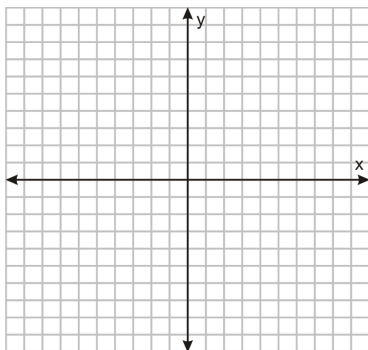
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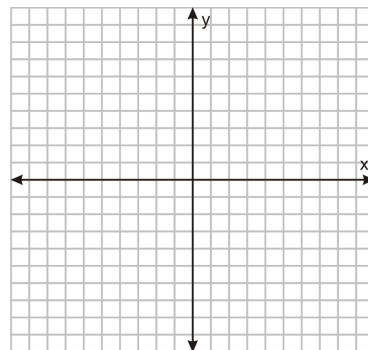
3. Find the slope and y-intercept of the equation of the line algebraically. Graph the line by hand. Label 2 points on each graph.

a)  $2x + 3y - 9 = 0$

b)  $3x + 7 = 0$



Slope \_\_\_\_\_ y - intercept \_\_\_\_\_



Slope \_\_\_\_\_ y - intercept \_\_\_\_\_

4. Find the equation of the line that passes through the points  $(-1, -3)$  and  $(14, 9)$ .

Point-Slope form: \_\_\_\_\_

Slope-Intercept form: \_\_\_\_\_

5. Find the equation of the line with a slope of zero and passes through the point  $(-3, 10)$

6. Write the equation of the line that contains the point  $(2, 1)$  and is:

a) parallel to the line  $4x - 2y = 3$

Slope-Intercept form: \_\_\_\_\_

Standard form: \_\_\_\_\_

b) perpendicular to the line  $4x - 2y = 3$

Slope-Intercept form: \_\_\_\_\_

Standard form: \_\_\_\_\_

7. Simplify each expression:

a)  $(4x^3)^2$

b)  $(5x^2z^6)^3(5x^2z^6)^{-3}$

c)  $\sqrt[3]{\frac{32a^2}{b^3}}$

d)  $2\sqrt{50} + 12\sqrt{8}$

e)  $7\sqrt{80x} - 2\sqrt{125x}$

f)  $\sqrt[6]{(x+1)^4}$

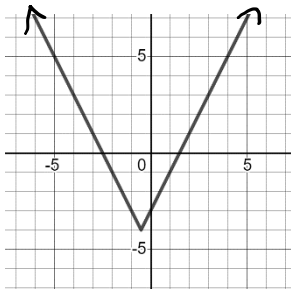
8. Rationalize the denominator of each expression:

a)  $\frac{1}{\sqrt{3}}$

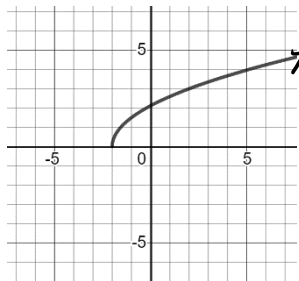
b)  $\frac{5}{\sqrt{14}-2}$

9. Determine if each of the following graphs represents one of the following choices:

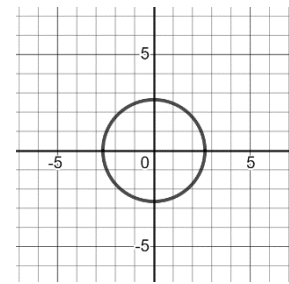
“NOT a Function” or “Function” or “One-to-One Function”. Write your choice on the line below.



\_\_\_\_\_



\_\_\_\_\_



\_\_\_\_\_

10. Given the function,  $f(x) = x^2 - 4x + 5$ , evaluate and simplify:

a)  $f(2)$

b)  $f\left(\frac{3}{2}\right)$

c)  $f(x + 2)$

11. Find the domain of the function, use interval notation.

a)  $f(x) = 5x^2 + 2x - 1$

b)  $f(x) = \frac{3x}{2x^2 + 11x + 12}$

c)  $f(x) = \sqrt{2x + 5}$

12. Perform the indicated operations and write the result in standard form:

a)  $(2x^2 + 1) - (x^2 - 2x + 1)$

b)  $-4x(3 - x^3)$

c)  $(2x + 5)^2$

d)  $(7x - 2)(4x - 3)$

e)  $5x(x + 1) - 3x(x + 1)$

13. **Factor** each expression completely:

$4x^3 - 6x^2 + 12x$	$4 - 36y^2$	$9x^2 - 12x + 4$
$27x^3 + 64$	$3x^2 - 5x + 2$	$x^3 + 5x^2 - 5x - 25$
$12x^2 - 5x - 2$	$x^4 - 7x^2 - 18$	

14. Solve each equation algebraically. Give *exact* solutions (no decimals).

a)  $x^2 - 3x + 4 = 0$

b)  $6x^2 + 11x = 10$

c)  $3x^2 - 11 = 2x^2 + 2x$

15. Use a graphing utility to approximate all relative minima and maxima of the function. Round to the nearest thousandth. Then, determine the intervals for which the function is increasing, decreasing, and/or constant. Use interval notation.

$$f(x) = -3x^4 + 2x^2 - 5$$

16. Simplify completely. Remember:  $i$  is the imaginary unit. Write each number in standard form.

a)  $\sqrt{-54}$

b)  $3i(2 + 4i)$

c)  $(4 - 3i)^2$

d)  $(7 - 2i)(-2 + i)$

e)  $(5 + 3i)(5 - 3i)$

f)  $\frac{-7 + 6i}{9 - 4i}$

17. Given  $f(x) = 2x^2 - 3$  and  $g(x) = \sqrt{4 - x}$ , find the function  $(f + g)(x)$  and its domain

18. Simplify each rational expression completely. State the restrictions on the variable(s).

a)  $\frac{18y^2}{60y^5}$

b)  $\frac{2x^2y}{xy - y}$

c)  $\frac{x^3 + 5x^2 + 6x}{x^2 - 4}$

19. Perform the operation and simplify completely. State the restrictions on the variable(s).

a)  $\frac{2x - 1}{x + 3} - \frac{1 - x}{x + 3}$

b)  $\frac{5}{x - 1} \cdot \frac{x - 1}{25(x - 2)}$

c)  $\frac{r}{r - 1} \div \frac{r^2}{r^2 - 1}$

d)  $\frac{t^2 - t - 6}{t^2 + 6t + 9} \cdot \frac{t + 3}{t^2 - 4}$

20. Solve each rational equation. State the restrictions on the variable.

a)  $\frac{x}{2} + \frac{6x}{7} = \frac{19}{14}$

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

c)  $\frac{5x-4}{5x+4} = \frac{2}{3}$

21. Given the one-to-one function,  $f(x) = 2x^3 - 5$ , find the inverse function.

22. Without a calculator, evaluate each expression.

a)  $\log_4 64$

b)  $\log_{\frac{1}{2}} 8$

23. Without a calculator, solve each equation.

a)  $\log_5 x = 1$

b)  $3^x = 9^2$

c)  $\log_b 343 = 3$

24. Solve the equations algebraically. Provide the exact solution and a decimal approximation to the nearest thousandth (if necessary).

a)  $10^x = 12$

b)  $\log_5(3x + 1) = 2$

c)  $\log 5x + \log(x - 1) = 2$

25. WITHOUT a Calculator: Given the quadratic function, find the vertex, axis of symmetry,  $x$  – intercepts,  $y$  – intercept, and graph and label at least 3 points. State the domain and range.

a)  $f(x) = -2(x + 4)^2 + 8$

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

Vertex: \_\_\_\_\_ Domain: \_\_\_\_\_

Vertex: \_\_\_\_\_ Domain: \_\_\_\_\_

AOS: \_\_\_\_\_ Range: \_\_\_\_\_

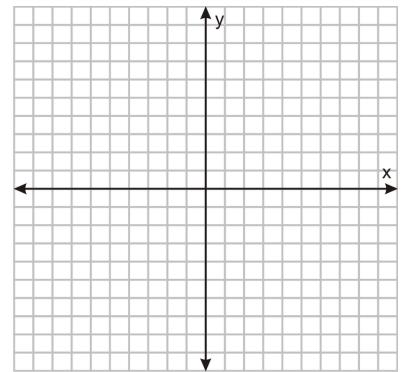
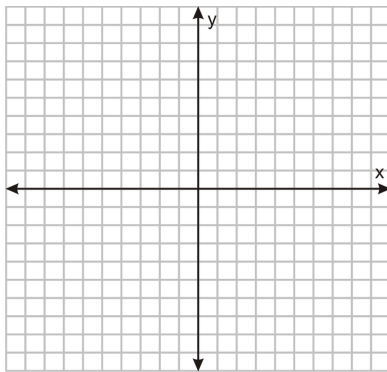
AOS: \_\_\_\_\_ Range: \_\_\_\_\_

$x$  – int(s): \_\_\_\_\_

$x$  – int(s): \_\_\_\_\_

$y$  – int: \_\_\_\_\_

$y$  – int: \_\_\_\_\_



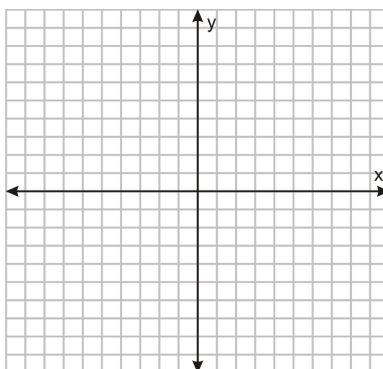
26. WITHOUT a Calculator: Complete the following for the given functions.

- i. State the parent/basic function.
- ii. List the sequence of all transformations. (Describe in words the transformations in the correct order)
- iii. Graph the function using the transformations. Label at least three points for each graph.
- iv. State the domain and range, and  $x$  and  $y$  – intercepts.

a)  $f(x) = \frac{1}{2}\sqrt{x + 3}$

Basic/Parent: \_\_\_\_\_

Transformations: \_\_\_\_\_



Domain: \_\_\_\_\_

Range: \_\_\_\_\_

$x$  – int(s): \_\_\_\_\_

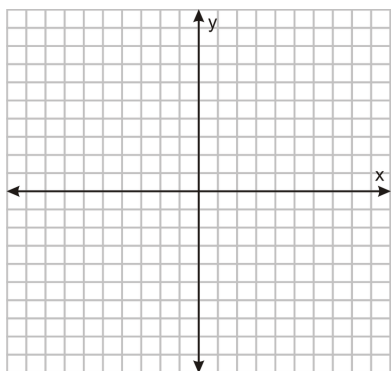
$y$  – int: \_\_\_\_\_



b)  $f(x) = 3(2)^x - 5$

Basic/Parent: \_\_\_\_\_

Transformations: \_\_\_\_\_



Domain: \_\_\_\_\_

Range: \_\_\_\_\_

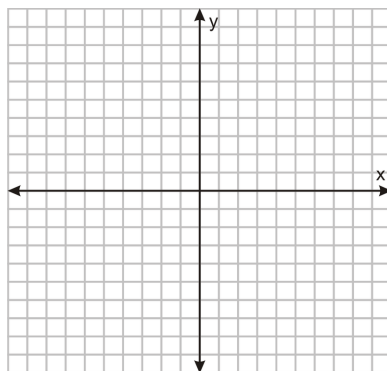
$x$  - int(s): \_\_\_\_\_

$y$  - int: \_\_\_\_\_

c)  $g(x) = -|x - 2| + 3$

Basic/Parent: \_\_\_\_\_

Transformations: \_\_\_\_\_



Domain: \_\_\_\_\_

Range: \_\_\_\_\_

$x$  - int(s): \_\_\_\_\_

$y$  - int: \_\_\_\_\_