

Name: _____

Enriched Precalculus Summer Assignment

Why are you getting this assignment?

This assignment is intended as:

1. an important refresher on some of the most important Algebra 2 concepts (since it's intended to refresh your memory, **this assignment should be done at the very end of the summer**)
and
2. a way for your teachers to begin the year with a sense of what your strengths and needs might be (therefore, **you should do this assignment on your own**)

Mastery of these concepts is essential to success in AP Precalculus

When is it due?

The assignment is due the first day of class next school year.

How long should it take?

Between 1 and 2 hours.

Will the assignment be graded?

Yes. It will count as two completed homework assignments, but it will NOT be graded for correctness, just for completeness, so do your own work and make a significant attempt at each problem.

How can I access the assignment?

Sign in to [deltamath.com](https://www.deltamath.com) using your student email and join the class with code **N35L-X9M3** or use the link: <https://www.deltamath.com/students?code=N35L-X9M3>

If you prefer to complete the assignment on paper, you can use the pages attached below.

Formulas:

1. Write out the following formulas:

Distance Formula

Midpoint Formula

Standard Form of an Equation of a Line

Slope/Intercept Form of an Equation of a Line

Point/Slope Form of an Equation of a Line

Quadratic Formula

Standard Form of a Quadratic Equation

Vertex Form of a Quadratic Equation

2. Factor the following:

Difference of Squares

$$x^2 - y^2 =$$

Perfect Square Trinomials

$$x^2 + 2xy + y^2 =$$

$$x^2 - 2xy + y^2 =$$

Sum and Difference of Cubes

$$x^3 + y^3 =$$

$$x^3 - y^3 =$$

Complex Numbers

3. What is the imaginary unit i represent?
4. What is the complex conjugate of $a + bi$?
5. Simplify the following:

$$i^2 =$$

$$i^3 =$$

$$i^4 =$$

6. Finish the exponent law.

$$b^x \cdot b^y =$$

$$\frac{b^x}{b^y} =$$

$$(ab)^x =$$

$$\left(\frac{a}{b}\right)^x =$$

$$b^0 =$$

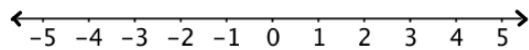
$$b^{-1} =$$

$$\text{if } b^x = b^y, \text{ then } x =$$

$$\text{if } a^x = b^x, \text{ then } a =$$

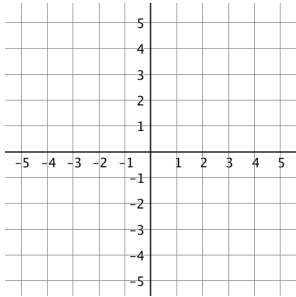
7. Solve the absolute value equation: $|-3x + 5| = 7$

8. Solve the inequality for x and graph the solution: $-7x - 1 > 13$

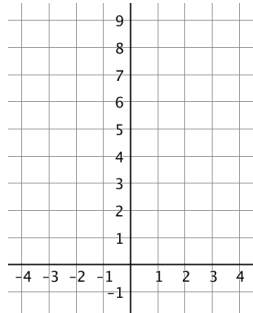


9. Graph the following functions.

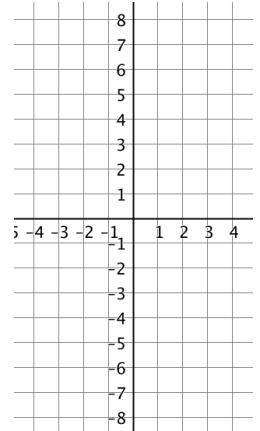
$$y = x$$



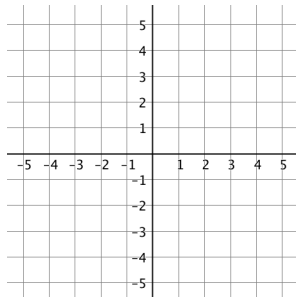
$$y = x^2$$



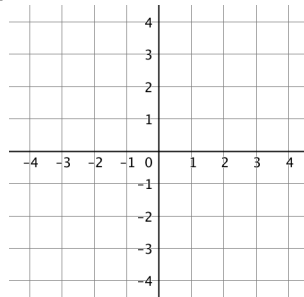
$$y = x^3$$



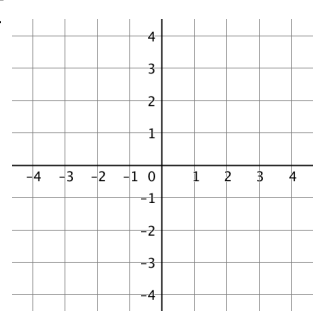
$$y = |x|$$



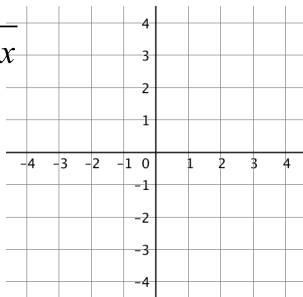
$$y = \sqrt{x}$$



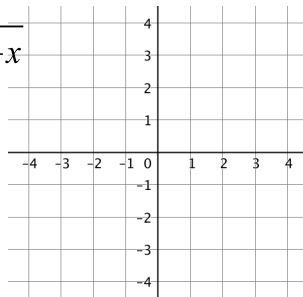
$$y = -\sqrt{x}$$



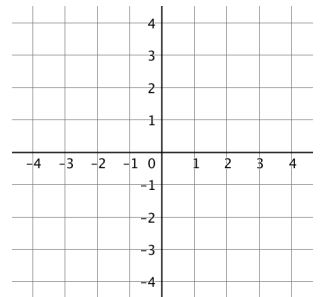
$$y = \sqrt{-x}$$



$$y = -\sqrt{-x}$$



$$y = \frac{1}{x}$$



10. Write the general method for finding:

a. the x -intercept(s) of a function

b. the y -intercept of a function

11. Describe the relationship between the slopes of:

a. parallel lines

b. perpendicular lines

12. Write the equation of the horizontal line through the point $(-2, 7)$. Give its slope.

13. Write the equation of the vertical line through the point $(-2, 7)$. Give its slope.

14. Write an equation of the linear function if $f(-1) = 0$ and $f(5) = 4$.

15. Solve for x . $\frac{x^2 - 1}{x - 1} = -2$

16. Simplify:

a. $(3 + 2i)(4 - 5i)$

b. i^{89}

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

17. Given $h(x) = x^3$, find:

a. $h(-3)$

b. $h(4\sqrt{2})$

c. $h(-2i)$

18. Factor completely.

a. $9x^2 - 81$

b. $x^4 - 16$

c. $8x^2 + 27$

d. $4x^2 - 12x + 9$

e. $x^3 - 2x^2 - 9x + 18$

f. $4x^6 - 20x^4 + 24x^2$

19. Solve:

a. $x^2 - 3x = 10$

b. $x^3 = 25x$

c. $\sqrt{4x} = x - 3$

20. Solve:

a. $9x^2 + 6x - 1 = 0$

b. $x^2 + 4x + 29 = 0$
(Solve over complex number system)

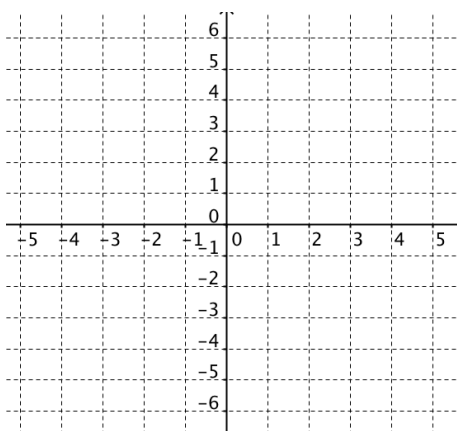
21. Find the zeros of the functions:

a. $g(x) = 1 - 5x + 6x^2$

b. $f(x) = 2x^4 - x^3 - x^2$

22. Sketch the graph. Label the vertex and the zeros.

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



23. What is the vertex of $y = -27(x + 31)^2 - 65$?

24. Explain how to find the inverse of a function.

25. Given $g(x) = 2x - 8$, find $g^{-1}(x)$.

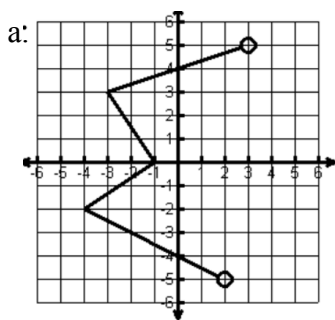
26. Simplify:

a. $27^{\frac{2}{3}}$

b. $8^{-\frac{2}{3}}$

c. $(2^{-1} + 3^{-1})^{-2}$

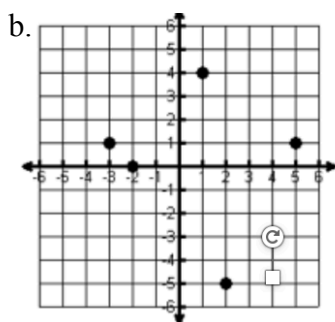
27. Find the domain and range. State whether the graph represents a function.



Domain: _____

Range: _____

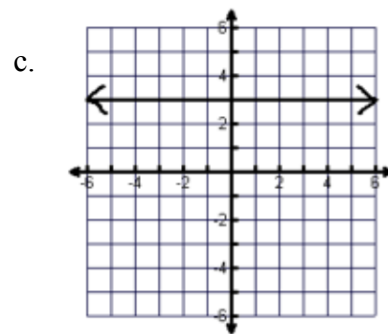
Function? _____



Domain: _____

Range: _____

Function? _____



Domain: _____

Range: _____

Function? _____

d. $y = -x^2 - 1$

Domain: _____

Range: _____

Function? _____

e. $y = \sqrt{x^2 - 9}$

Domain: _____

Range: _____

Function? _____

28. Find the domain only.

a. $y = \frac{(x-1)(x+2)}{x(x+3)(x-4)}$

b. $y = \sqrt{16 - x^2}$

29. Simplify.

a. $\frac{2x^2-24x+40}{7x^2-71x+10}$

b. $\frac{5x^3-40x^2}{3x^2-25x+8}$

c. $\frac{p^2+6p-7}{p^2+4p-5} \cdot \frac{p^2-3p-40}{p^2+9p+14}$

d. $\frac{a^2-11a+10}{a^2-7a-30} \div \frac{a-10}{a^2-13a+30}$

30. Simplify.

a. $\frac{5}{2} - \frac{2n-5}{n-6}$

b. $\frac{2}{x+6} + \frac{2}{x-1}$

c. $\frac{\frac{m^2}{3} + \frac{1}{m}}{m^2}$

d. $\frac{\frac{2}{x-2} + \frac{x-5}{x^2-4}}{\frac{6}{x+2}}$