

## Summer Assignment for DE Precalculus

- 1) You may use reference materials to complete this assignment.
- 2) The following sites may be useful: [www.mathispower4u.com](http://www.mathispower4u.com) , [www.khanacademy.com](http://www.khanacademy.com)
- 3) The assignment covers material you must know to be successful in DE Pre-Calc.
- 4) Please take the assignment seriously.
- 5) The assignment is due the 1st Friday of the Academic Year 2024/2025.
- 6) The Assignment will be used as a Part I for Test I (Test I will cover these materials).
- 7) Please email at [isaac.zawolo@apsva.us](mailto:isaac.zawolo@apsva.us) should you have any questions.
- 8) Please use a spiral notebook for this assignment. Loose-leaves papers will not be accepted.

Name: \_\_\_\_\_ Date of submission: \_\_\_\_\_

*Show all work - no credit will be awarded for answers missing appropriate work.  
No calculators!*

## I. Week 1: Solving Absolute Value Equations and Inequalities

I. Solve each of the following. Write the solution in set notation.

1)  $|3x-5|+1=11$

2)  $\frac{3}{4}|x+4|+12=-11$

3)  $|7x-6|+13=13$

4)  $\left|\frac{3}{2}x+\frac{4}{3}\right|-\frac{2}{5}=\frac{4}{3}$

5)  $12=|4x-6|+4$

II. Solve and graph each of the following. Write the solution in interval notation.

1)  $|22-(5-2x)|>40$

2)  $6+\left|\frac{x}{3}-5\right|\geq 9$

3)  $\frac{1}{9}|5y-3|-3\leq 2$

4)  $18>\frac{2}{3}|6+x|+4$

5)  $\frac{1}{9}|5y-3|-3\leq 2$

## II. Week II: Factoring and Solving Polynomial Equations

Factor each of the following completely

1)  $x^2 - 4x - 32$

2)  $3b^2 - 24b + 45$

3)  $2y^2 + 17y + 21$

4)  $-m^2 + 10m - 24$

5)  $6b^2 - ab - 15a^2$

6)  $-7x^2 - 35x + 42$

7)  $-14 - 29y + 15y^2$

8)  $8w^9 - 2w^5y^{12}$

9)  $125y^3 - 1$

10)  $5p^3 + 2p^2 - 45p - 18$

11)  $4 + 7x - 2x^2$

12)  $-18x^2 - 3x + 1$

13)  $64 - m^6$

Solve each of the following. Find only real solutions.

14)  $x(x^2 - 3)(x + 5)(2x - 7) = 0$

15)  $x^2 - 3x - 40 = 0$

16)  $x^4 - 16 = 0$

### III. Week III: Solving Quadratic Equations

Solve each of the following by the indicated method

- 1) **Square Root Method:**  $(x+1)^2 - 15 = 16$
- 2) **Square Root Method:**  $-2(x+5)^2 - 4 = -12$
- 3) **Square Root Method:**  $6(y-11)^2 - 5 = -29$
- 4) **By factoring:**  $35x^2 - 6 = x$
- 5) **Quadratic Formula:**  $x^2 + 7 = 5x$
- 6) **Quadratic Formula:**  $x^2 - 4x = -9$
- 7) **Quadratic Formula:**  $5d^2 + 6d + 9 = -2d^2 - 3d$
- 8) **Completing the Square:**  $x^2 - 8x = 9$
- 9) **Completing the square:**  $y^2 + 6y = 0$
- 10) **Solve using and method:**  $3x^2 - 5x - 8 = 0$
- 11) **Solve using and method:**  $4x^2 - 9 = 0$

Determine the number, nature of the solution and the number of x-intercepts without solving or graphing

- 12)  $4x^2 - 12x + 9 = 0$
- 13)  $7x^2 + 5x + 2 = 0$
- 14)  $7x^2 + 5x - 2 = 0$
- 15)  $x^2 - 7 = 0$

#### IV. Week IV: Simplifying and Solving Rational Expressions and Equations

Perform the indicated operation or solve the equations

1) Simplify the expressions:  $\frac{x^3 - 64}{x^2 - 2x - 8}$

2) Simplify the expression:  $\frac{2 - x}{x^2 + 4x - 12}$

3) Multiply  $\frac{6x^2 - 24}{4(x - 5)} \cdot \frac{5x^2 - 125}{x^2 - 4x + 4}$

4) Divide:  $\frac{3a^2 - 2a - 8}{a^2 - 4} \div \frac{3a + 4}{2a^2 + 3a + 2}$

5) Multiply  $\frac{-8x^3 + 64}{4x^3 + 4x^2 + x} \times \frac{x^2 + 2x + 4}{4x^2 - 1}$

6) Simplify  $\frac{8 - 7y - y^2}{y + 8} \cdot \frac{y + 5}{1 - y} \div \frac{9y + 45}{y - 8}$

7) Simplify  $\frac{1 - 25x^2}{6x^2 + 11x + 3} \cdot \frac{15x^2 + 14x + 3}{25x^2 - 10x - 3}$

8) Add:  $\frac{3x}{x - 1} + \frac{x + 2}{1 - x}$

9) Subtract:  $\frac{5x - 1}{x + 3} - \frac{x}{x - 5}$

10) Simplify:  $\frac{-x}{x^2 + 3x - 40} - \frac{x}{x - 5} + \frac{2x}{x^2 + 16x + 64}$

11) Subtract:  $\frac{2}{x^2 - 4x - 21} - \frac{3}{7 - x}$

12) Simplify:  $\frac{4n}{n - 2} + \frac{3}{n + 5} - \frac{4n^2}{n^2 + 3n - 10}$

13) Simplify:  $\frac{\frac{12-x}{45x}}{\frac{x-12}{9x^5}}$

14) Simplify;  $\frac{\frac{4}{x} - 2x}{\frac{1}{x^2} - 4}$

15) Simplify:  $\frac{\frac{8}{x-3} - \frac{2}{x+4}}{\frac{8}{x^2} - \frac{x-4}{x+3}}$

16) Solve;  $\frac{x+3}{x} + \frac{x-5}{2x} = \frac{3x+1}{5x}$

17) Solve:  $\frac{5x-2}{x^2} = \frac{7}{3x}$

18) Solve  $\frac{3x}{5x-15} + \frac{7}{x^2+2x-15} = \frac{1}{x+5}$

## V. Week V: Simplifying and Solving Radical Expressions and Equations

Perform the indicated operation

- 1) Simplify  $\sqrt[3]{24v^7w^8}$
- 2) Multiply and write in simplest radical form  $\sqrt[4]{27a^{12}b^3c^7w^8} \cdot \sqrt[4]{3b^5c^9}$
- 3) Multiply and write in simplest radical form  $(4\sqrt{3a} - 3\sqrt{2b})(7\sqrt{6a} + 5\sqrt{2b})$
- 4) Multiply and write in simplest radical form  $(7\sqrt{5y} - 2\sqrt{3y})^2$
- 5) Divide  $\frac{3 - \sqrt{2x}}{5 - \sqrt{7x}}$

6) Complete the Table

Number	Radical Form (Simplest Radical Form)	Rational Exponent Form (simplest form)
1.		$x^{\frac{2}{3}}y^{\frac{5}{4}}z^{\frac{1}{2}}$
2.	$\sqrt[3]{128m^7n^4p^6}$	
3.	$\sqrt{250a^7b^{14}c^6}$	
4.		$7a^{\frac{2}{5}}b^{\frac{5}{7}}z^{\frac{1}{2}}$

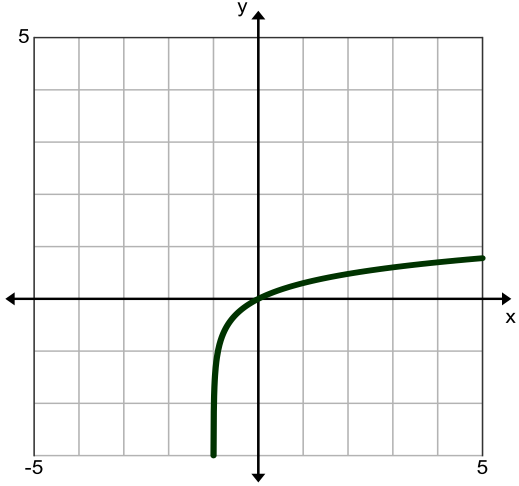
Solve the equation

- 7)  $\sqrt[3]{x-3} - 9 = -1$
- 8)  $5\sqrt{(x-3)^2} = 125$
- 9)  $3\sqrt{(y-2)^2} = 75$
- 10)  $(x-2)^{\frac{3}{2}} = 81$

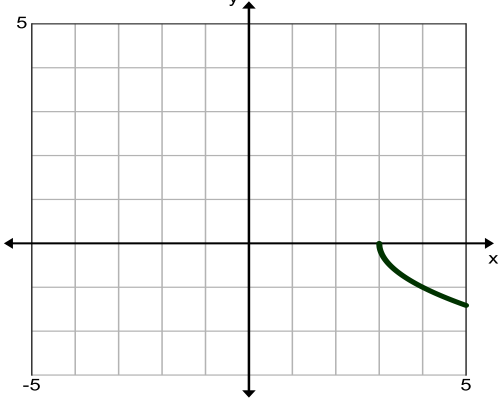
## VI. Week VI: Graphing and Analyzing Functions

For each of the following, state the family of function (linear, absolute value, quadratic, square root, exponential, logarithmic, cubic or cube root) to which it belongs. Find the domain, range and describe the transformation.

1) Analyze

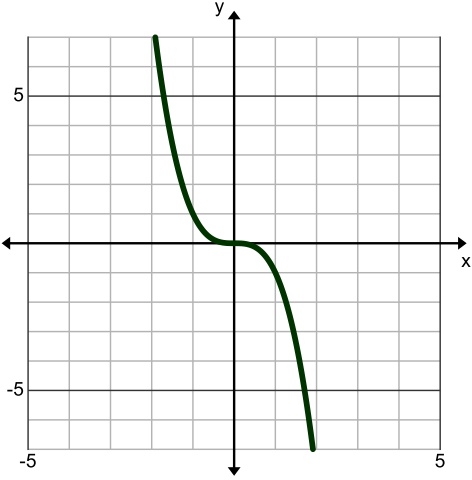
Function	Analysis
	<p>Family:</p> <p>Domain:</p> <p>Range:</p> <p>Transformation:</p> <p>X-intercept/s:</p> <p>Y-intercept:</p> <p>Increasing on:</p> <p>Decreasing on:</p> <p>Constant on:</p>

2) Analyze

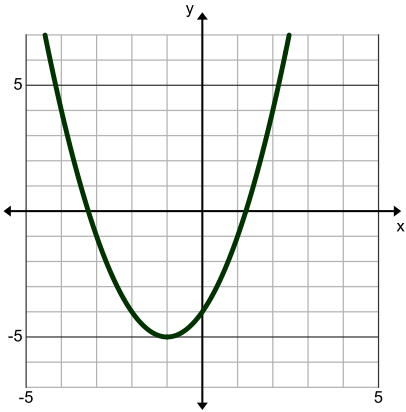
Function	Analysis
	<p>Family:</p> <p>Domain:</p> <p>Range:</p> <p>Transformation:</p> <p>X-intercept/s:</p> <p>Y-intercept:</p> <p>Increasing on:</p> <p>Decreasing on:</p> <p>Constant on:</p>

3) Analyze

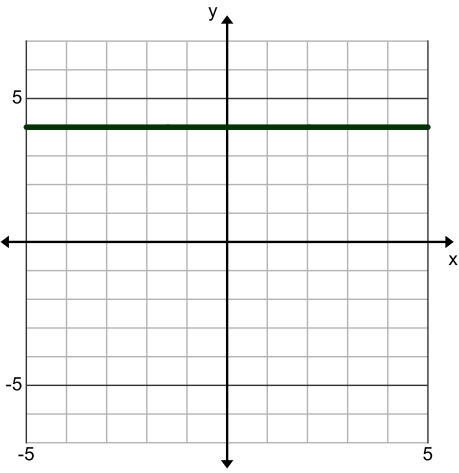


Function	Analysis
	<p><b>Family:</b></p> <p><b>Domain:</b></p> <p><b>Range:</b></p> <p><b>Transformation:</b></p> <p><b>X-intercept/s:</b></p> <p><b>Y-intercept:</b></p> <p><b>Increasing on:</b></p> <p><b>Decreasing on:</b></p> <p><b>Constant on:</b></p>

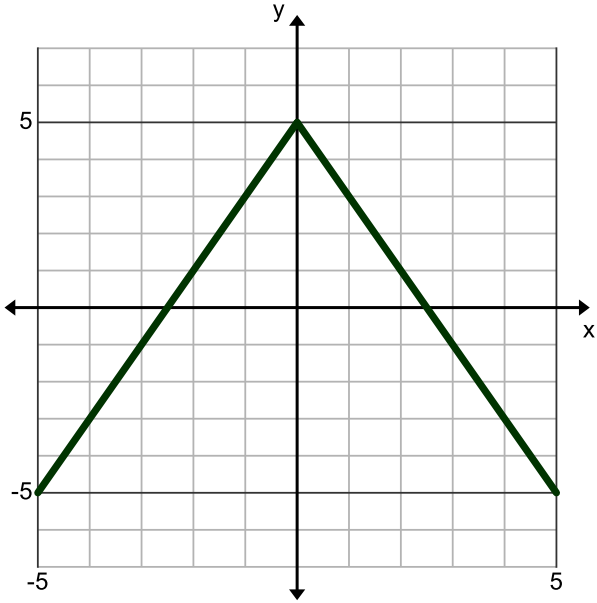
**4) Analyze**

Function	Analysis
	<p><b>Family:</b></p> <p><b>Domain:</b></p> <p><b>Range:</b></p> <p><b>Transformation:</b></p> <p><b>X-intercept/s:</b></p> <p><b>Y-intercept:</b></p> <p><b>Increasing on:</b></p> <p><b>Decreasing on:</b></p> <p><b>Constant on:</b></p>

**5) Analyze**

Function	Analysis
	<p><b>Family:</b></p> <p><b>Domain:</b></p> <p><b>Range:</b></p> <p><b>Transformation:</b></p> <p><b>X-intercept/s:</b></p> <p><b>Y-intercept:</b></p> <p><b>Increasing on:</b></p> <p><b>Decreasing on:</b></p> <p><b>Constant on:</b></p>

6) Analyze

Function	Analysis
	<p><b>Family:</b></p> <p><b>Domain:</b></p> <p><b>Range:</b></p> <p><b>Transformation:</b></p> <p><b>X-intercept/s:</b></p> <p><b>Y-intercept:</b></p> <p><b>Increasing on:</b></p> <p><b>Decreasing on:</b></p> <p><b>Constant on:</b></p>

7) Analyze

Function	Analysis
	<p>Family:</p> <p>Domain:</p> <p>Range:</p> <p>Transformation:</p> <p>X-intercept/s:</p> <p>Y-intercept:</p> <p>Increasing on:</p> <p>Decreasing on:</p> <p>Constant on:</p>

8) Analyze

Function	Analysis
	<p>Family:</p> <p>Domain:</p> <p>Range:</p> <p>Transformation:</p> <p>X-intercept/s:</p> <p>Y-intercept:</p> <p>Increasing on:</p> <p>Decreasing on:</p> <p>Constant on:</p>

9) Analyze

Function	Analysis
	<p>Family:</p> <p>Domain:</p> <p>Range:</p> <p>Transformation:</p> <p>X-intercept/s:</p> <p>Y-intercept:</p> <p>Increasing on:</p> <p>Decreasing on:</p> <p>Constant on:</p>

10) Analyze

Function	Analysis
	<p>Family:</p> <p>Domain:</p> <p>Range:</p> <p>Transformation:</p> <p>X-intercept/s:</p> <p>Y-intercept:</p> <p>Increasing on:</p> <p>Decreasing on:</p> <p>Constant on:</p>

Given the parent function write the function which is obtained after all the indicated transformations are applied.

11) Parent function is  $y = x^2$ , up 3 units, right 5 and reflected about the x - axis.

12) Parent Function is:  $y = |x|$  left 2, reflected about the y - axis

13) Parent Function is:  $y = x^3$  down 6, stretched vertically by a factor of 3 and left 1

14) Parent Function is:  $y = \sqrt{x}$  vertical compressed by a factor of  $\frac{1}{2}$ , up 3 and right 4.

15) Parent Function is:  $y = 3^x$ , horizontal shift by -2, vertical shift by 3

## VII. Week 7: Trigonometry - Basic

Complete the table by converting to degree or radian measure.

Number	Radian Measure	Degree Measure
1.		$60^\circ$
2.	$2\pi/5$	
3.	$11\pi/12$	
4.		$150^\circ$
5.		$225^\circ$
6.	$15\pi/6$	

Find the six trigonometric function values of each of the following for angles  $A$  and  $B$  if  $a$  is the side opposite angle  $A$ ,  $b$  is the side opposite angle  $B$ ,  $c$  is the hypotenuse and angle  $C$  is a right angle.

7.  $a=2, b=3$

8.  $b=4, c=5$

9.  $a=9, b=3$

10.  $a=5, c=8$

11.  $c=12, a=5$

12.  $b=6, a=8$

13.  $c=2, a=1$

14.  $a=1, b=1$

15.  $c=4, a=3$