

Summer Assignment DE PreCalculus, Ertan KAYA 2022

- 1) You may use reference materials to complete this assignment.**
- 2) The assignment covers material you must know to be successful in PreCalculus.**
- 3) Please take the assignment seriously.**
- 4) The assignment is due the 1st Monday of the Academic Year 2022/2023**
- 5) The Assignment will be used as a Quiz Grade.**
- 6) Please email at ertan.kaya@apsva.us should you have any questions.**

I. 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) $\left|\frac{x}{5}-6\right|+25=8$

4) $|7x-6|+13=13$

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

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

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

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

2) $8+|6-2x|\geq 1$

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

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

5) $18>\frac{2}{3}|6+x|+4$

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

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) $14y^9 - 21y^9$

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

10) $125y^3 - 1$

11) $5p^3 + 2p^2 - 45p - 18$

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

13) $-18x^2 - 3x + 1$

14) $-5x - 2x^2 + 1$

15) $64 - m^6$

Solve each of the following. Find only real solutions.

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

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

18) $3x^2 - 5x = -2$

19) $3x^2 - x = 10$

20) $x^4 - 16 = 0$

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. 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. 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 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) $5\sqrt[3]{(x-3)^2} = 125$

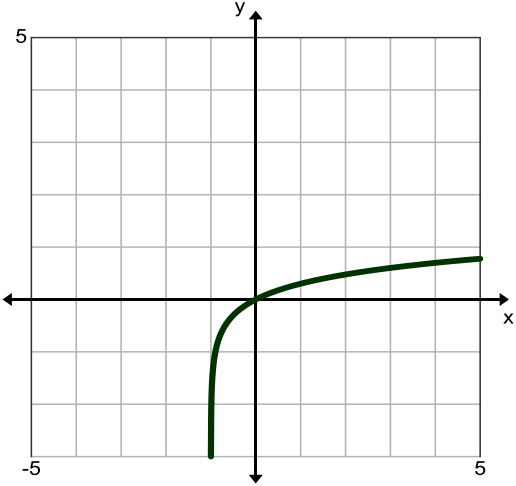
9) $3\sqrt[4]{(y-2)^2} = 75$

10) $(x-2)^{\frac{3}{2}} = 81$

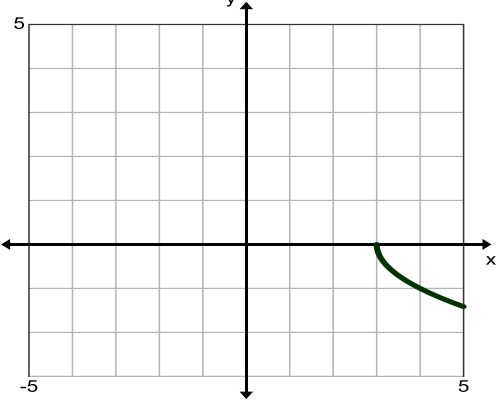
VI. Graphing and Analyzing Functions

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.

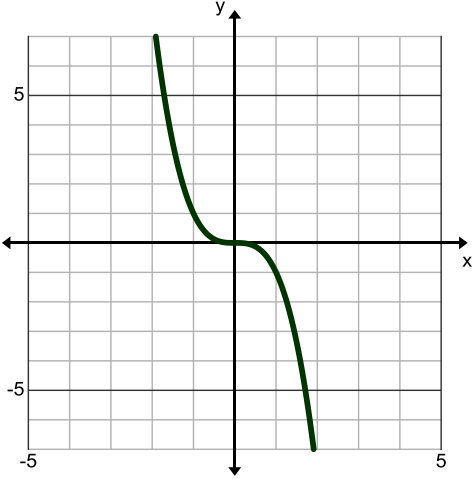
1) Analyze

| Function | Analysis |
|--|--|
|  | <p>Family:</p> <p>Domain:</p> <p>Range:</p> <p>Transformation:</p> |

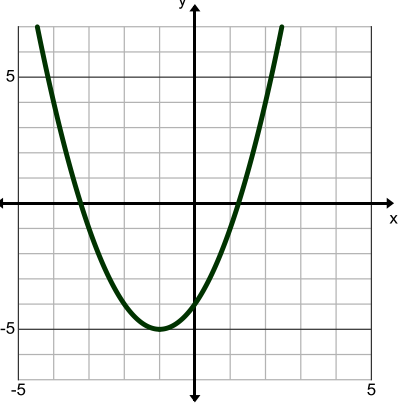
2) Analyze

| Function | Analysis |
|---|--|
|  | <p>Family:</p> <p>Domain:</p> <p>Range:</p> <p>Transformation:</p> |

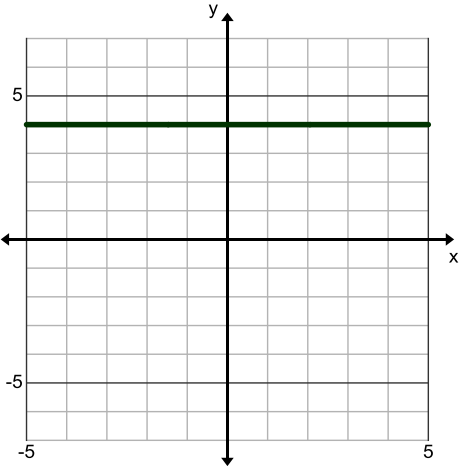
3) Analyze

| Function | Analysis |
|---|--|
|  | <p>Family:</p> <p>Domain:</p> <p>Range:</p> <p>Transformation:</p> |

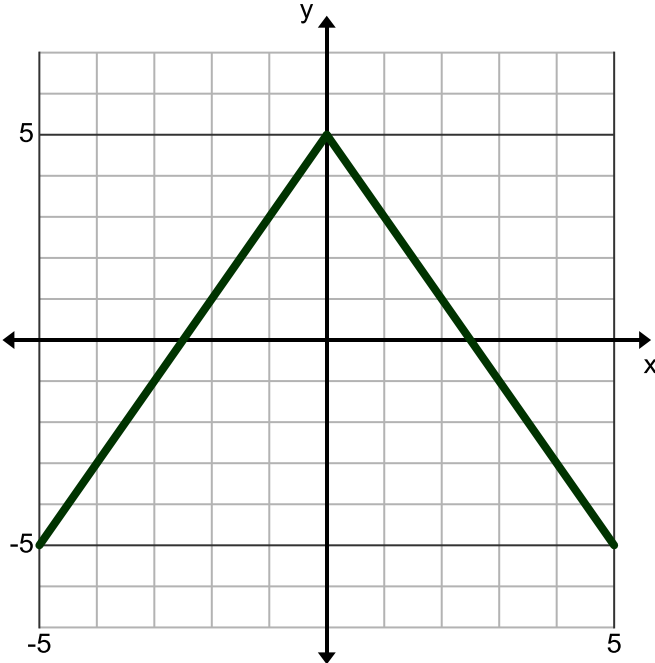
4) Analyze

| Function | Analysis |
|---|--|
|  | <p>Family:</p> <p>Domain:</p> <p>Range:</p> <p>Transformation:</p> |

5) Analyze

| Function | Analysis |
|---|--|
|  | <p>Family:</p> <p>Domain:</p> <p>Range:</p> <p>Transformation:</p> |

6) Analyze

| Function | Analysis |
|---|--|
|  | <p>Family:</p> <p>Domain:</p> <p>Range:</p> <p>Transformation:</p> |

7) Analyze

| Function | Analysis |
|----------|--|
| | <p>Family:</p> <p>Domain:</p> <p>Range:</p> <p>Transformation:</p> |

8) Analyze

| Function | Analysis |
|----------|--|
| | <p>Family:</p> <p>Domain:</p> <p>Range:</p> <p>Transformation:</p> |

9) Analyze

| Function | Analysis |
|----------|--|
| | <p>Family:</p> <p>Domain:</p> <p>Range:</p> <p>Transformation:</p> |

10) Analyze

| Function | Analysis |
|----------|--|
| | <p>Family:</p> <p>Domain:</p> <p>Range:</p> <p>Transformation:</p> |

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

- 11) Parent function is $y = x^2$
- 12) Parent Function is: $y = |x|$
- 13) Parent Function is: $y = x^3$
- 14) Parent Function is: $y = \sqrt{x}$
- 15) Parent Function is: $y = 3^x$