**SOL Review Topic 4: Solving Equations and Inequalities**

Absolute Value Equations, Rational Equations, Radical Equations, Quadratics, Systems, Inequalities

Absolute Value Equations

1)  2) 

Absolute Value Inequalities

3)  4) 

Radical and Rational Exponent Equations

5)  6) 

Rational Equations

7)  8)  9) 

Systems

Solve the system and state the number of solutions to the system.

10) 11) 

Quadratics

Solve and describe the nature of the roots.

12)  13)  14) 

15) Find  for .

Mixed Practice

16)  17)  18) 

19) 20)  21) 

EXTRA NOTES AND EXAMPLES:

Solving Absolute Value Equations:

Set up 2 cases and solve for both: Ex) 

 CHECK your solutions!

Solving Absolute Value Inequalities

 LessthAND () (graph is ‘in between’) versus GreatOR () (graph opposite directions)

Set up 2 cases—Remember to flip the sign when setting up the 2nd negative case!

 Ex) 1:  Ex) 2: 

  

Solving Quadratic Equations:

To solve a quadratic equation you may be asked to find the **solutions**, **zeros**, or **roots**. These answers will also be found on a graph (called a parabola) as **x-intercepts**.

***Note:*** A quadratic equation can have **two solutions, one solution** (a double root-touches the x-axis and turns around) **or no real solutions** (graph does not cross the *x*-axis)**.**

Solving by Factoring:

1) Get the equation equal to zero. Move everything to left side.

2) Factor the left side using an appropriate technique we have learned.

3) Set each factor = 0 and solve.

Ex) Solve for *x*: 

 

Solving using the Quadratic Formula: 

Get the equation equal to zero. Move everything to left side. Find *a, b, c* and plug into the formula: Don’t forget to simplify!

Ex) 

EXTRA NOTES AND EXAMPLES:

Rational Equations

**Step 1**: Multiply each term of the equation by the LCD.

**Step 2**: List the values that must be **excluded** from the solution. These are values of the variable that make the denominator = 0 (these values make the equation undefined).

**Step 3**: Solve for the variable. Check your solution in the ORIGINAL equation!

Ex)  LCD is 



Radical Equations

Steps to solving radical equations:

(1) get the radical on the side by itself (“isolate the radical”) (2) square (or cube, etc) both sides of the equation (3) solve for the variable (4) check for **extraneous** solutions

Ex) 

 

Non-linear systems

|  |  |
| --- | --- |
| Ex) |  Solve linear quadratic system:  *y* = *x*2 - 4*x* - 2  and   *y* = *x* – 2 |
|   | 1.  Enter the first equation into **Y1.**2.  Enter the second equation into **Y2**.3.  Hit **GRAPH.** system94.  Use the **INTERSECT** option twice to find the two locations where the graphs intersect (the answers).     **2nd TRACE (CALC) #5 intersect**     Move spider close to the intersection.     Hit **ENTER** 3 times.5.  Answer:  (5,3)  and  (0,-2)                      | system10system12 |

PRACTICE G:





PRACTICE H:



 

PRACTICE I:

 