**Activity 2.2.3 Solve Equations by Factoring**

When you multiply two or more factors and the result is zero, then at least one of the factors has to be \_\_\_\_.

Example: given that (*x* + 5)*(x* - 2)= 0, then by the special property of zero either *x* + 5 = 0 or *x* - 2 = 0

So we solve:  *x* + 5=0  *x* – 2= 0

  *x* = \_\_\_ or  **x** =\_\_\_\_

Check to see if (*x* + 5)(*x* - 2)= 0 is a true statement if -5 is substituted in for x:

Check to see if (*x* + 5)(*x* - 2)= 0 is a true statement if 2 is substituted in for x:

The two solutions to the equation (*x* + 5)(*x* - 2)= 0 are \_\_\_\_ and ­­\_\_\_\_\_.

To solve the quadratic equation in one variable by factoring: If needed obtain an equivalent equation with one side 0, factor the nonzero side into linear factors, set each linear factor = 0, solve.

A. SOLVE:

1.  2. 

3.  4. 

5.  6. 

Solve each equation by factoring, if possible. If not factorable over the integers, write “trinomial is prime”.

7. $d^{2}+6d+9=0$ 8. $3(x^{2}+7x-1)$+5=2(x+1)

9.  10. 

11. $9x^{2}-16=0$ 12. 

13. Here are two quadratic equations that cannot be solved by factoring over the integers. One equation has no real number solutions. The other equation has two irrational, real solutions. Which one is which? Justify your answer.

a. $x^{2}+x-1=0$ b. $x^{2}+x+1=0$

B. Now, let’s work backwards.

If you are given the answers to a quadratic equation, how can you find the equation?

Suppose the solutions to a quadratic equation are 2 and -5. What does a quadratic equation look like **just before** you find the solutions?

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How does that become a quadratic equation? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Is there another equation that has the same solutions?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Write a quadratic equation first in factored form, then multiply out to obtain a quadratic with integral coefficients in the form  with the given solutions.

14.  15. 

16.  17. $x= -2, and-2$

C. Mixed Practice: solve the following linear and quadratic equations:

18.  19. 2r+64=16r

20.  21. $r^{2}-64=0$

22. $2x^{2}+3x-11=2(x-1)(x+1)$ 23. 

24. If the two solutions of a quadratic equation are 5 and -7, what is an equation with those solutions?

D. Summary:

1. How can you tell if an equation in one variable is linear or quadratic? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

a. After simplifying, a linear equation has a degree of \_\_\_\_\_\_ and will have \_\_\_\_\_\_\_ solution(s).

b. After simplifying, a quadratic equation has a degree of \_\_\_\_\_\_\_ and will have at

most \_\_\_\_\_\_ solution(s).

2. How do you solve a linear equation in one variable?

3. How do you solve a quadratic equation in one variable using the factoring method?