A1 S2 w7d4 9-4 Solving by Factoring

Alg 1 Week 7 Fri Warm Up

1. Skill 13: Multiplying Polynomials: Use a rectangle to multiply and simplify.

$(2x^2 - 3)\ (x^2 + 6x - 7)$

2. Skill 14: Factor a trinomial. Factor completely.

$10x^3 - 2x^2 + 20x$

3. Skill 15: Factor Special Polynomials. Factor completely.

$8x^2 + 24x + 18$

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Alg 1 Week 7 Tues CW

Finding Your Roots

1. Find the value of each expression:

   a. (3)(0) = b. (-16)(0) = c. (123,456.789)(0) =

   d. (0)(28.7) = e. (0)(any number) = f. (any number)(0) =

   g. Is there any other way to make the answer be 0 other than to make one of the numbers 0?

Question #1 illustrates what is known as the **Zero Product Property**. This property is helpful when solving quadratics by factoring.

Zero Product Property

When multiplying two numbers, the only way for the product to be zero is for one of the numbers to be zero.

2.. In each factored expression, what values for the variable would make the equation true? (These values are the solutions of the equations.)

a. $(x)(x-2)=0$

b. $(x)(x+4)=0$

c. $(x+1)(x-3)=0$

d. $(x-6)(x-4)=0$

e. $(x+5)(x+5)=0$

f. $x(x+7)(x-9)=0$

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Alg 1 Week 7 Tue

Solving By Factoring

Factoring can be useful when solving quadratic equations, because it is easy to identify the solutions in the factored form. They are simply the opposites of the constants in each set of parentheses. The factoring step in this process should only be done when the quadratic equation is in **standard form**.

Standard form of a quadratic equation

A quadratic equation is in *standard form* if it is in the form

$ax^2 + bx + c = 0$

where a, b, and c are integers, and $a \neq 0$.

Here is a recap of how this process works:

Skill 16: Solving quadratic equations by factoring

Step 1: Put the equation into *standard form* if necessary.

Step 2: Factor the quadratic expression.

Step 3: Identify the values of the variable that make each part of the factored expression 0. These are the solutions.

Step 4: Check your answer by substituting the solutions back into the original quadratic equation.

Example: Solve $x^2 + 7x = -6$ by factoring.

Step 1: Get standard form: $x^2 + 7x = -6$

$+6 \quad +6$

$x^2 + 7x + 6 = 0$

Step 2: Factor: $x^2 + 7x + 6 = 0$

$(x+6)(x+1) = 0$

Step 3: Find solutions: If $x + 6 = 0$, then $x = -6$. If $x + 1 = 0$, then $x = -1$.

The solutions are $x = -6$ or $x = -1$

Step 4: Check answers:

Check $x = -6$:

$(-6)^2 + 7(-6) = -6$

$36 + -42 = -6$

$-6 = -6$ √

Check $x = -1$:

$(-1)^2 + 7(-1) = -6$

$1 + -7 = -6$

$-6 = -6$ √

Use the process described above to solve each equation.

1. $a^2 + 4a + 3 = 0$

2. $b^2 - 3b - 10 = 0$

3. $c^2 + 7c + 10 = 0$

4. $d^2 - 6d + 9 = 0$

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5. $e^2 + 10e + 25 = 0$

6. $8f^2 + 7f - 18 = 0$

7. $g^2 + 5g = 6$

8. $3h^2 - 11h - 4 = 0$

9. $2j^2 - j - 15 = 0$

10. $4k^2 = 16$

11. $5m^2 + 17m = 12$

12. $4n^2 - 4n - 3 = 0$

13. $p^2 = 10p - 9$

14. $3q^2 - 23q + 14 = 0$

15. $4r^2 + 16r + 15 = 0$

16. $9s^2 + 4 = 12s$