

Section 6.6: SOLVING QUADRATIC EQUATIONS BY FACTORING

When you are done with your homework you should be able to...

- π Use the zero-product principle
- π Solve quadratic equations by factoring
- π Solve problems using quadratic equations

WARM-UP:

1. Factor:

$$x^2 - 8x + 7$$

2. Solve:

$$x - 7 = 0$$

DEFINITION OF A QUADRATIC EQUATION

A _____ in _____ is an equation that can be written in the _____

where _____, _____, and _____ are real numbers, with _____.

_____ in _____ is also called a _____-

_____ equation in _____.

SOLVING QUADRATIC EQUATIONS BY FACTORING

Consider the quadratic equation $x^2 - 8x + 7 = 0$. How is this different from the first warm-up?

We can _____ the _____ side of the _____ equation _____ to get _____. If a quadratic equation has a zero on one side and a _____ on the other side, it can be _____ using the _____ principle.

THE ZERO-PRODUCT PRINCIPLE

If the _____ of two or more _____ expressions is _____, then _____ one of them is _____ to _____.

Example 1: Solve the following equations:

a. $2x - 11 = 0$

b. $x + 1 = 0$

c. $(2x - 11)(x + 1) = 0$

STEPS FOR SOLVING A QUADRATIC EQUATION BY FACTORING

1. If necessary, _____ the equation in _____ form _____, moving all _____ to one side, thereby obtaining _____ on the other side.
2. _____.
3. Apply the _____ - _____ principle, setting each _____ equal to _____.
4. _____ the equations formed in step 3.
5. _____ the _____ in the _____ equation.

Example 2: Solve:

a. $x(x+9) = 0$

b. $8(x-5)(3x+11) = 0$

c. $x^2 + x - 42 = 0$

d. $x^2 = 8x$

e. $4x^2 = 12x - 9$

f. $(x+3)(3x+5) = 7$

g. $x^3 - 4x = 0$

h. $(x-3)^2 + 2(x-3) - 8 = 0$

APPLICATION

An explosion causes debris to rise vertically with an initial velocity of 72 feet per second. The formula $h = -16t^2 + 72t$ describes the height of the debris above the ground, h , in feet, t seconds after the explosion.

a. How long will it take for the debris to hit the ground?

b. When will the debris be 32 feet above the ground?