

4.2 Factoring Quadratic Equations

Review of Factoring:

Ex. Factor each of the following

a) $2x^2 - 4x + 16$

b) $x^2 + 7x + 12$

c) $2x^2 - x - 6$

d) $x^2 + 6x + 9$

e) $x^2 - 36$

f) $2x^2 + 3xy - 2y^2$

g) $4x^2 - 49$

It is important to note that when factoring an expression such as

$$x^2 + 6x + 8$$

the possible binomial factors can only contain factors of 8 since the numbers will multiply to give 8 using the product and sum method.

Therefore, $x+5$ would not be a possible factor of $x^2 + 6x + 8$.

Turn Over

Example 1

Factor Quadratic Expressions

Factor.

a) $2x^2 - 2x - 12$

b) $\frac{1}{4}x^2 - x - 3$

c) $9x^2 - 0.64y^2$

Example 1: Your Turn

Factor.

a) $3x^2 + 3x - 6$

b) $\frac{1}{2}x^2 - x - 4$

c) $0.49j^2 - 36k^2$

Assign p. 229-230 #'s 1(ac), 2(b), 3(bcd), 4(abc), 18

Ex. Factor each of the following

a) $2(x-2)^2 + 7(x-2) + 5$

Method 1 using Substitution

Method 2 by Expanding

b) $2(x+1)^2 - 7(x+1) - 30$

c) $6(x-3)^2 - 4(x-3) - 2$

d) $4(2x-3)^2 - 25(x+2)^2$

Turn over

Example 2

Factor Polynomials of Quadratic Form

Factor each polynomial.

a) $12(x + 2)^2 + 24(x + 2) + 9$

b) $9(2t + 1)^2 - 4(s - 2)^2$

Example 2: Your Turn

Factor each polynomial.

a) $-2(n + 3)^2 + 12(n + 3) + 14$

b) $4(x - 2)^2 - 0.25(y - 4)^2$

Assign p. 230 questions 5(bc), 6(ac), 26, 27(abd)

After the quadratic equation has been factored, you then use the **Zero Product Property**.

The Zero Product Property states that *if the product of two real numbers is zero, then one or both of the numbers must be zero.*

For example, solve $5x^2 + 14x - 3 = 0$

When we factor this we get $(5x-1)(x+3)$, therefore using the zero product property we get

To verify the solutions, we substitute the solutions back into the equation to see that the value makes the equation true.

Turn Over

Example 3

Solve Quadratic Equations by Factoring

Determine the roots of each quadratic equation. Verify your solutions.

a) $x^2 + 6x + 9 = 0$

b) $x^2 + 4x - 21 = 0$

c) $2x^2 - 9x - 5 = 0$

d) $x^2 - 4x = 0$

e) $x^2 - 4 = 0$

f) $x^2 - 8 = 0$

g) $(x - 2)^2 - 49 = 0$

h) $3x^2 - 4 = x$

Key Ideas p. 229

Assign p.230 #'s 7(bdef), 8(cde), 9(bcdf), 10(bd)