

Name: \_\_\_\_\_

Date: \_\_\_\_\_

Notes

Algebra Section 9.7

Pages 600-605

**Goal:** “You will factor special products”

**Difference of Two Squares Pattern:**  $a^2 - b^2 = (a + b)(a - b)$

**Example:**  $4x^2 - 9 = (2x)^2 - 3^2 = (2x + 3)(2x - 3)$



**Factor:**

**Ex:**  $y^2 - 16$

$(y + 4)(y - 4)$

**Ex:**  $x^2 - 9$

$(x - 3)(x + 3)$

**Ex:**  $25m^2 - 16$

$(5m - 4)(5m + 4)$

**Ex:**  $x^2 - 49y^2$

$(x - 7y)(x + 7y)$

**Ex:**  $8 - 18n^2$

$2(4 - 9n^2)$   
 $2(2 + 3n)(2 - 3n)$

**Ex:**  $4y^2 - 64$

$4(y^2 - 16)$   
 $4(y + 4)(y - 4)$

**Ex:**  $64c^2 - 16$

$16(c^2 - 1)$   
 $16(c - 1)(c + 1)$

**Ex:**  $x^2 - 81y^2$

$(x + 9y)(x - 9y)$

**Ex:**  $12 - 48m^2$

$12(1 - 4m^2)$   
 $12(1 + 2m)(1 - 2m)$

**Ex:**  $n^2 - 12n + 36$

$(n - 6)^2$

**Ex:**  $9x^2 - 12x + 4$

$(3x - 2)^2$

**Ex:**  $4s^2 + 4st + t^2$

$(4s + t)^2$

**Ex:**  $a^2 + 6a + 9$

$$(a + 3)^2$$

**Ex:**  $4n^2 + 20n + 25$

$$(2n + 5)^2$$

**Ex:**  $9c^2 - 6cd + d^2$

$$(3c - d)^2$$

**Ex:**  $-3y^2 + 36y - 108$

$$\begin{aligned} & -3(y^2 - 12y + 36) \\ & -3(y - 6)^2 \end{aligned}$$

**Ex:**  $-2x^2 - 16x - 32$

$$\begin{aligned} & -2(x^2 + 8x + 16) \\ & -2(x + 4)^2 \end{aligned}$$

**Ex:**  $h^2 + 4h + 4$

$$(h + 2)^2$$

**Ex:**  $2y^2 - 20y + 50$

$$\begin{aligned} & 2(y^2 - 10y + 25) \\ & 2(y - 5)^2 \end{aligned}$$

**Ex:**  $3x^2 + 6xy + 3y^2$

$$\begin{aligned} & 3(x^2 + 2xy + y^2) \\ & 3(x + y)^2 \end{aligned}$$

**Solve:**

**Ex:**  $x^2 + \frac{2}{3}x + \frac{1}{9} = 0$

$$\begin{aligned} & \left(x + \frac{1}{3}\right)^2 = 0 \\ & x = -\frac{1}{3} \end{aligned}$$

**Ex:**  $x^2 - 5x + \frac{25}{4} = 0$

$$\begin{aligned} & \left(x - \frac{5}{2}\right)^2 = 0 \\ & x = \frac{5}{2} \end{aligned}$$

**Ex:**  $a^2 + 6a + 9 = 0$

$$\begin{aligned} & (a + 3)^2 = 0 \\ & a = -3 \end{aligned}$$

**Ex:**  $w^2 - 14w = -49$

$$\begin{aligned} & w^2 - 14w + 49 = 0 \\ & (w - 7)^2 = 0 \\ & w = 7 \end{aligned}$$

**Ex:**  $n^2 - 81 = 0$

$$\begin{aligned} & (n - 9)(n + 9) = 0 \\ & n = 9, n = -9 \end{aligned}$$

**Ex:**  $x^2 = 49$

$$\begin{aligned} & x^2 - 49 = 0 \\ & (x + 7)(x - 7) = 0 \\ & x = 7, x = -7 \end{aligned}$$

**Ex:** A window washer drops a wet sponge from a height of 64 feet. After how many seconds does the sponge land on the ground?

\*When you drop something its initial velocity is zero!

$$\begin{aligned}h &= -16t^2 + 64 \\0 &= -16(t^2 - 4) \\0 &= -16(t + 2)(t - 2) \\t &= 2\end{aligned}$$

**Ex:** A rock is dropped from a riverbank that is 4 feet above the surface of the river. After how many seconds does the rock hit the water?

$$\begin{aligned}h &= -16t^2 + 4 \\0 &= -4(4t^2 - 1) \\0 &= -4(2t + 1)(2t - 1) \\t &= \frac{1}{2} \text{ seconds}\end{aligned}$$