

# 2.8 Factor Special Products

Georgia  
Performance  
Standard(s)

MM1A2f

**Goal** • Factor special products.

p. 89



## DIFFERENCE OF TWO SQUARES PATTERN

Algebra

$$a^2 - b^2 = (a + b)(\underline{a - b})$$

Example

$$9x^2 - 4 = (3x)^2 - 2^2 = (\underline{3x + 2})(\underline{3x - 2})$$

or  $(3x - 2)(3x + 2)$

Factor the polynomial.

$$\begin{aligned} z^2 - 81 &= z^2 - \underline{9}^2 \\ &= (z + \underline{9})(z - \underline{9}) \end{aligned}$$

$$\begin{aligned} a^2 - 25b^2 &= a^2 - (\underline{5b})^2 \\ &= (a + \underline{5b})(a - \underline{5b}) \end{aligned}$$

$$\begin{aligned} 16x^2 - 9 &= (\underline{4x})^2 - \underline{3}^2 \\ &= (\underline{4x} + \underline{3})(\underline{4x} - \underline{3}) \end{aligned}$$



Factor the polynomial.

What is the GCF between 4 &  $16n^2$ ?

4

$$\begin{aligned}4 - 16n^2 &= \underline{4} (\underline{1} - \underline{4n^2}) \\ &= \underline{4} [(\underline{1})^2 - (\underline{2n})^2] \\ &= \underline{4} (\underline{1} + \underline{2n})(\underline{1} - \underline{2n})\end{aligned}$$

1.  $x^2 - 100$

$$(x + 10)(x - 10)$$

2.  $49y^2 - 25$

$$(7y)^2 - (5)^2$$

$$(7y + 5)(7y - 5)$$

3.  $c^2 - 9d^2$

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

$$(c + 3d)(c - 3d)$$

4.  $45 - 80m^2$

What is the GCF between 45 &  $80m^2$ ?

$$5(9 - 16m^2) \quad 5[3^2 - (4m)^2]$$

$$5(3 + 4m)(3 - 4m)$$



## PERFECT SQUARE TRINOMIAL PATTERN

Algebra

$$a^2 + 2ab + b^2 = (\underline{a + b})^2 \quad \leftarrow \text{Review!}$$

$$a^2 - 2ab + b^2 = (\underline{a - b})^2$$

$$x^2 + 8x + 16 = x^2 + 2(x \cdot 4) + 4^2 = (\underline{x + 4})^2$$

$$x^2 - 6x + 9 = x^2 - 2(x \cdot 3) + 3^2 = (\underline{x - 3})^2$$

You are looking  
for a pattern.

Factor the polynomial.

$$\begin{aligned} \text{a. } x^2 - 10x + 25 &= x^2 - 2(\underline{x})(\underline{5}) + \underline{5}^2 \\ &= (\underline{x - 5})^2 \end{aligned}$$

Find b first.

$$\begin{aligned} \text{b. } y^2 + 12y + 36 &= y^2 + 2(\underline{y})(\underline{6}) + \underline{6}^2 \\ &= (\underline{y + 6})^2 \end{aligned}$$



5.  $x^2 + 14x + 49$

$$x^2 + 2(x)(7) + 7^2$$

$$(x + 7)^2$$

6.  $t^2 - 22t + 121$

$$t^2 - 2(t)(11) + 11^2$$

$$(t - 11)^2$$



**Factor the polynomial.**

$$\text{a. } 4y^2 - 12y + 9 = (\underline{2y})^2 - 2(\underline{(2y)(3)}) + \underline{3}^2$$
$$(2y - 3)^2$$

**What is the GCF between  $3z^2$ ,  $24z$ , &  $48$  AND will remove the negative?**

$$\text{b. } -3z^2 + 24z - 48 = \underline{-3} (z^2 - 8z + 16)$$
$$= \underline{-3} [z^2 - 2(\underline{(z)(4)}) + \underline{4}^2]$$
$$-3(z - 4)^2$$



$$\text{c. } 49s^2 + 56st + 16t^2 = (\underline{7s})^2 + 2(\underline{(7s)(4t)}) + \underline{(4t)^2}$$

$$(7s + 4t)^2$$



$$\begin{aligned} 7. \quad & 16x^2 - 40xy + 25y^2 \\ & (4x)^2 - 2[(4x)(5y)] + (5y)^2 \\ & (4x - 5y)^2 \end{aligned}$$

$$\begin{aligned} 8. \quad & -5r^2 - 20r - 20 \\ & -5(r^2 + 4r + 4) \\ & -5[r^2 + 2(r)(2) + 2^2] \\ & -5(r + 2)^2 \end{aligned}$$



Solve the equation  $x^2 + x + \frac{1}{4} = 0$ .

$$\underline{4x^2 + 4x + 1} = 0$$

Multiply each side  
by 4.

$$(2x)^2 + 2x(2) + 1^2 = 0$$

$$(2x + 1)^2 = 0$$

$$2x + 1 = 0$$

$$-1 = -1$$

---

$$\underline{2x} = \underline{-1}$$

$$\frac{2x}{2} = \frac{-1}{2}$$

$$x = -\frac{1}{2}$$



$$9. m^2 - 8m + 16 = 0$$

$$m^2 - 2m(4) + 4^2 = 0$$

$$(m - 4)^2 = 0$$

$$m - 4 = 0$$

$$+ 4 = +4$$

---

$$m = 4$$



$$10. t^2 - 121 = 0$$

$$(t + 11)(t - 11) = 0$$

$$t + 11 = 0$$

$$t - 11 = 0$$

$$t = -11, 11$$



Assignment

p. 91

2, 6, 10, 18, 26

**Quiz 2:1 – 7**

**FRIDAY**

