

8.7 FACTORING DIFFERENCES OF SQUARES

Remember this pattern from earlier in the chapter?

DIFFERENCE OF SQUARES

$$a^2 - b^2 = (a + b)(a - b)$$

EXAMPLE: $9x^2 - 25$

$$\left(\underset{\downarrow}{3x} \right)^2 - \left(\underset{\downarrow}{5} \right)^2$$

$$(3x + 5)(3x - 5)$$

EXAMPLES: FACTOR EACH BINOMIAL, IF POSSIBLE.

1. $m^2 - 81$
 $\left(\underset{\text{"a"}}{m} \right)^2 - \left(\underset{\text{"b"}}{9} \right)^2$

$$(a + b)(a - b)$$

$$(m + 9)(m - 9)$$

3. $8y^2 - 1$

$$\cancel{(2y)^2 - 1^2}$$

prime

2. $25t^2 - 6$
 $(5t)^2 - \cancel{6^2}$

prime

4. $9h^2 - 64$
 $(3h)^2 - (8)^2$

$$(3h + 8)(3h - 8)$$

EXAMPLES: FACTOR EACH BINOMIAL, IF POSSIBLE.

$$5. \quad \begin{array}{c} \sqrt{} ^2 - \sqrt{} ^2 \\ (3x)^2 \quad (10y)^2 \\ (3x+10y)(3x-10y) \end{array}$$

$$6. \quad \begin{array}{c} \sqrt{} ^2 - \sqrt{} ^2 \\ (5g)^2 \quad (8h)^2 \\ (5g+8h)(5g-8h) \end{array}$$

$$7. \quad \begin{array}{c} \sqrt{} ^2 - \sqrt{} ^2 \\ (7w)^2 \quad (4)^2 \\ (7w+4)(7w-4) \end{array}$$

$$8. \quad \begin{array}{c} \sqrt{} ^2 - \sqrt{} \\ (c)^2 \quad \cancel{(40)^2} \\ \text{prime} \end{array}$$

ALWAYS
LOOK
FOR A
GCF
FIRST!!

$$9. \quad \begin{array}{c} 54 - 24x^2 \\ 6(\sqrt{} - \sqrt{}) \\ 6(3)^2 \quad (2x)^2 \\ 6(3+2x)(3-2x) \end{array}$$

$$10. \quad \begin{array}{c} 75x^3 - 12xy^2 \\ 3x(\sqrt{} - \sqrt{}) \\ 3x(5x)^2 \quad (2y)^2 \\ 3x(5x+2y)(5x-2y) \end{array}$$

$$11. 2c^2 - 32 = 0$$

$$2(c^2 - 16) = 0$$

$(c)^2$ $(4)^2$

$$2(c+4)(c-4) = 0$$

$$2 \neq 0 \quad \begin{array}{r} c+4=0 \\ -4 \quad -4 \\ \hline c=-4 \end{array} \quad \begin{array}{r} c-4=0 \\ +4 \quad +4 \\ \hline c=4 \end{array}$$

$$12. 50 - 98d^2 = 0$$

$$2(25 - 49d^2) = 0$$

$(5)^2$ $(7d)^2$

$$2(5+7d)(5-7d) = 0$$

$$\begin{array}{r} 5+7d=0 \\ -5 \quad -5 \\ \hline 7d=-5 \\ \frac{7d}{7} = \frac{-5}{7} \\ d = -\frac{5}{7} \end{array} \quad \begin{array}{r} 5-7d=0 \\ -5 \quad -5 \\ \hline -7d=-5 \\ \frac{-7d}{-7} = \frac{-5}{-7} \\ d = \frac{5}{7} \end{array}$$

$$13. d^2 = 81$$

$$d^2 - 81 = 0$$

$(d)^2$ $(9)^2$

$$(d+9)(d-9) = 0$$

$$\begin{array}{r} d+9=0 \\ -9 \quad -9 \\ \hline d=-9 \end{array} \quad \begin{array}{r} d-9=0 \\ +9 \quad +9 \\ \hline d=9 \end{array}$$

$$14. -100t^2 = -196$$

$$\sqrt{-100t^2 + 196} = 0$$

$$196 - 100t^2 = 0$$

$$4(49 - 25t^2) = 0$$

$(7)^2$ $(5t)^2$

$$4(7+5t)(7-5t) = 0$$

$$\begin{array}{r} 7+5t=0 \\ -7 \quad -7 \\ \hline 5t=-7 \\ \frac{5t}{5} = \frac{-7}{5} \\ t = -\frac{7}{5} \end{array} \quad \begin{array}{r} 7-5t=0 \\ -7 \quad -7 \\ \hline -5t=-7 \\ \frac{-5t}{-5} = \frac{-7}{-5} \\ t = \frac{7}{5} \end{array}$$