Intermediate Algebra
Skill Builder # PF – 10
Factoring the Difference of Squares

A polynomial is a difference of squares if it looks like

$$a^2 - b^2 \text{ or } \square^{\,2} - \bigcirc^{\,2}$$

and will factor as

$$(a-b)(a+b) \text{ or } (\square - \bigcirc)(\square + \bigcirc)$$

<u>Examples</u>

1. $x^2 - 64$

    Solution:

$$x^2 - 64 = x^2 - 8^2 = (x-8)(x+8)$$

2. $81 - n^2$

    Solution:

$$81 - n^2 = 9^2 - n^2 = (9-n)(9+n)$$

3. $4a^2 - b^2$

    Solution:

$$4a^2 - b^2 = (2a)^2 - b^2$$
$$= (2a+b)(2a-b)$$

4. $25y^2 - 16x^2$

    Solution:

$$25y^2 - 16x^2 = (5y)^2 - (4x)^2$$
$$= (5y-4x)(5y+4x)$$

5. $\dfrac{a^2}{36} - \dfrac{b^2}{64}$

    Solution:

$$\frac{a^2}{36} - \frac{b^2}{64} = \left(\frac{a}{6}\right)^2 - \left(\frac{b}{8}\right)^2$$
$$= \left(\frac{a}{6} - \frac{b}{8}\right)\left(\frac{a}{6} + \frac{b}{8}\right)$$

6. $\dfrac{1}{9}x^2 - \dfrac{1}{4}y^2$

    Solution:

$$\frac{1}{9}x^2 - \frac{1}{4}y^2 = \left(\frac{1}{3}x\right)^2 - \left(\frac{1}{2}y\right)^2$$
$$= \left(\frac{1}{3}x - \frac{1}{2}y\right)\left(\frac{1}{3}x + \frac{1}{2}y\right)$$

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Factor.

1. $x^2 - 36$

2. $49 - x^2$

3. $81n^2 - m^2$

4. $m^2 - 64n^2$

5. $16a^2 - 81b^2$

6. $49b^2 - 144a^2$

7. $\dfrac{y^2}{81} - \dfrac{x^2}{100}$

8. $\dfrac{1}{25}a^2 - \dfrac{1}{49}b^2$

9. $\dfrac{4}{49}n^2 - \dfrac{25}{81}$

10. $4 - \dfrac{36}{121}y^2$

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Answers

1. $(x-6)(x+6)$

2. $(7-x)(7+x)$

3. $(9n-m)(9n+m)$

4. $(m+8n)(m-8n)$

5. $(4a-9b)(4a+9b)$

6. $(7b+12a)(7b-12a)$

7. $\left(\dfrac{y}{9}-\dfrac{x}{10}\right)\left(\dfrac{y}{9}+\dfrac{x}{10}\right)$

8. $\left(\dfrac{1}{5}a+\dfrac{1}{7}b\right)\left(\dfrac{1}{5}a-\dfrac{1}{7}b\right)$

9. $\left(\dfrac{2}{7}n-\dfrac{5}{9}\right)\left(\dfrac{2}{7}n+\dfrac{5}{9}\right)$

10. $\left(2-\dfrac{6}{11}y\right)\left(2+\dfrac{6}{11}y\right)$