

# Factoring Special Cases

**Difference of Squares:**  $x^2 - y^2 = (x - y)(x + y)$  or  $x^2 + 0xy - y^2$

1.  $x^2 - 16$

$$(x-4)(x+4)$$

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

$$(5-xy)(5+xy)$$

3.  $81x^2 - 4$

$$(9x-2)(9x+2)$$

4.  $4x^2 - 1$

$$(2x-1)(2x+1)$$

5.  $16x^2 - 121$

$$(4x-11)(4x+11)$$

6.  $49x^2 - 36$

$$(7x-6)(7x+6)$$

**Mixed Review:** Factor out a GCF, and then apply a factor rule

1.  $24g^2 - 6$

$$6(4g^2 - 1)$$

2.  $12t^2 - 48$

$$12(t-2)(t+2)$$

3.  $12x^2 + 12x + 3$

$$3(2x+1)^2$$

4.  $5x^2 + 13x + 30$

Prime

5.  $100x^2 - 81y^2$  Diff of Squares

$$(10x+9)(10x-9)$$

6.  $2x^2 + 12x + 10$

$$2(x+3)(x+2)$$

7.  $x^2 - 12x + 36$

$$(x-6)^2$$

8.  $4x^2 + 20x + 25$

$$(2x+5)^2$$

9.  $4x^2 + 24x + 36$

$$4(x+3)^2$$

10.  $x^2 - 14x + 49$

$$(x-7)^2$$

11.  $16m^2 - 72m + 81$

$$(4m-9)^2$$

12.  $81r^2 - 90r + 25$

$$(9r-5)^2$$

# AREA - FACTORING APPLICATION

1. The area of a rectangle is  $g^2 + 3g - 10$ , find the dimensions of the rectangle.

$$L = (g+5)$$

$$W = (g-2)$$

2. The area of a square is  $m^2 + 10m + 25$ . Find the length of each side.

$$\text{side} = m+5$$

3. Find the perimeter of the square in question #2.

$$4m+20$$

4. The volume of a rectangular prism is  $8m^3 - 128m$ . Find the length of all three sides. How many sides are binomials?

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$$\begin{array}{l} L = 8m \\ W = (m-4) \\ H = (m+4) \end{array} \left. \vphantom{\begin{array}{l} L \\ W \\ H \end{array}} \right\} \text{no particular order}$$

5. The area of a rectangle is  $10w^2 - 19w - 15$ . If one of the sides is  $(2w - 5)$ , what is the length of the other side?

$$5w+3$$

6. Is it possible for a rectangle to have an area of  $2y^2 + 11y + 18$ , if the side lengths are binomials?

No, it can't factor

7. The area of a rectangular book cover is  $4x^2 - 6x - 40$ . The width of the book cover is  $2x - 8$ , what is the length of the cover?

$$2x+5$$

8. The area of a rectangular swimming pool is  $10x^2 - 19x - 15$ . The length of the pool is  $5x + 3$ . What is the width of the pool?

$$2x-5$$

9. The area of a square rug is  $4k^2 + 12k + 9$ . What is the perimeter of the rug?

$$\text{side} = 2k+3$$

$$\text{Perimeter} = 8k+12$$

10. Factor:  $72g^2h - 43gh + 6h$

$$h(9g-2)(8g-3)$$

~~$$\begin{array}{r} 43g \\ -43 \end{array}$$~~

11. Factor:  $8x^3 + 4x^2 - 18x - 9$

$$(2x+1)(2x-3)(2x+3)$$

12. Which binomial is a factor of  $2n^2 - 32n$ ?

a.  $2n - 8$

b.  $n + 16$

c.  $n - 16$

d.  $n + 4$

13. Which binomial is a factor of  $14a^2 - 15a + 4$ ?

a.  $7a + 2$

b.  $14a - 1$

c.  $7a - 1$

d.  $7a - 4$