

*Part A: Factoring Completely***Practice 1**

1.

$$(3x - 4)(3x + 4)$$

2.

cannot be factored

3.

$$2(2x^2 + 19x + 35)$$

$$2((2x^2 + 5x) + (14x + 35))$$

$$2(x(2x + 5) + 7(2x + 5))$$

$$2(2x + 5)(x + 7)$$

4.

$$(10x^2 - 35x) + (22x - 77)$$

$$5x(2x - 7) + 11(2x - 7)$$

$$(2x - 7)(5x + 11)$$

5.

$$5x(x^2 + x - 6)$$

$$5x((x^2 + 3x) + (-2x - 6))$$

$$5x(x(x + 3) - 2(x + 3))$$

$$5x(x + 3)(x - 2)$$

6.

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

$$(x - 3)(x + 3)(x^2 + 9)$$

7.

$$2(2v^2 + 13v + 6)$$

$$2((2v^2 + 12v) + (v + 6))$$

$$2(2v(v + 6) + 1(v + 6))$$

$$2(v + 6)(2v + 1)$$

8.

cannot be factored

9.

$$(6x^2 - 1x) + (18x - 3)$$

$$x(6x - 1) + 3(6x - 1)$$

$$(6x - 1)(x + 3)$$

10.

$$\begin{aligned}
 & -4(x^2 - 7x + 10) \\
 & -4(x^2 - 5x) + (-2x + 10) \\
 & -4(x(x - 5) - 2(x - 5)) \\
 & -4(x - 5)(x - 2)
 \end{aligned}$$

11.

$$\begin{aligned}
 & (2x^2y^2 - 2x^2) + (-18xy^3 + 18xy) \\
 & 2x^2(y^2 - 1) - 18xy(y^2 - 1) \\
 & (2x^2 - 18xy)(y^2 - 1) \\
 & 2x(x - 9y)(y - 1)(y + 1)
 \end{aligned}$$

12.

$$\begin{aligned}
 x^2 + \frac{13}{2}x - \frac{7}{2} &= \frac{1}{2}bh \\
 2x^2 + 13x - 7 &= bh \\
 (2x - 1)(x + 7) &= bh
 \end{aligned}$$

The base and height are $2x - 1$ and $x + 7$ feet.

13.

$$\begin{aligned}
 & x(2x^2 + 11x + 5) \\
 & x((2x^2 + 1x) + (10x + 5)) \\
 & x(x(2x + 1) + 5(2x + 1)) \\
 & x(2x + 1)(x + 5)
 \end{aligned}$$

The side lengths are x , $2x + 1$, and $x + 5$ units long.

Practice 2

1.

cannot be factored

2.

$$\begin{aligned}
 & 4(x^2 - 20x + 100) \\
 & 4(x^2 - 10x) + (-10x + 100) \\
 & 4(x(x - 10) - 10(x - 10)) \\
 & 4(x - 10)^2
 \end{aligned}$$

3.

$$\begin{aligned}
 & -3x(x^2 + 8x + 12) \\
 & -3x(x^2 + 6x) + (2x + 12) \\
 & -3x(x(x + 6) + 2(x + 6)) \\
 & -3x(x + 6)(x + 2)
 \end{aligned}$$

4.

$$(2b^2 - 6b) + (-3b + 9)$$

$$2b(b - 3) - 3(b - 3)$$

$$(b - 3)(2b - 3)$$

5.

$$(4x^4 - 4x^2) + (-9x^2 - 9)$$

$$4x^2(x^2 - 1) - 9(x^2 - 1)$$

$$(x^2 - 1)(4x^2 - 9)$$

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

6.

$$x^3(5x^2 - x - 6)$$

$$x^3((5x^2 - 6x) + (5x - 6))$$

$$x^3(x(5x - 6) + 1(5x - 6))$$

$$x^3(5x - 6)(x + 1)$$

7.

$$2(2x^2 + 11x + 5)$$

$$2((2x^2 + 1x) + (10x + 5))$$

$$2(x(2x + 1) + 5(2x + 1))$$

$$2(2x + 1)(x + 5)$$

8.

cannot be factored

9.

$$3(8x^2 + 13x - 6)$$

$$3((8x^2 - 3x) + (16x - 6))$$

$$3(x(8x - 3) + 2(8x - 3))$$

$$3(8x - 3)(x + 2)$$

10.

$$(6x^2 - 9x) + (2x - 3)$$

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

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

11.

$$2(x^2 + \frac{10}{7}x + \frac{25}{49})$$

$$2((x^2 + \frac{5}{7}x) + (\frac{5}{7}x + \frac{25}{49}))$$

$$2(x(x + \frac{5}{7}) + \frac{5}{7}(x + \frac{5}{7}))$$

$$2(x + \frac{5}{7})^2$$

The side lengths of the prism are 2 inches on one side and $(x + \frac{5}{7})$ inches on two sides.

12.

$$(x^4 - 4x^2) + (-9x^2y^2 + 36y^2)$$

$$x^2(x^2 - 4) - 9y^2(x^2 - 4)$$

$$(x^2 - 9y^2)(x^2 - 4)$$

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

Part B: Solving Polynomial Equations Equal to Zero

Practice 1

1.

$$x + 1 = 0, x - 72 = 0$$

$$x = -1, 72$$

2.

$$x - 10 = 0, x + 10 = 0$$

$$x = \pm 10$$

3.

$$x = 0, x - 18 = 0, x + 3 = 0$$

$$x = 0, 18, -3$$

4.

$$2x - 7 = 0, 5x + 11 = 0$$

$$x = \frac{7}{2}, -\frac{11}{5}$$

5.

$$3x = 0, x + 1 = 0, 9x - 14 = 0$$

$$x = 0, -1, \frac{14}{9}$$

6.

$$4x - 5 = 0, 6x + 1 = 0, x + 2 = 0$$

$$x = \frac{5}{4}, -\frac{1}{6}, -2$$

7.

$$(x - 22)(x + 3) = 0$$

$$x = 22, -3$$

8.

$$(x - 12)(x + 12) = 0$$

$$x = \pm 12$$

9.

$$(x + 14)(x + 14) = (x + 14)^2 = 0$$

$$x = -14$$

10.

$$(4x + 5)(x + 3) = 0$$

$$4x + 5 = 0, x + 3 = 0$$

$$x = -\frac{5}{4}, -3$$

11.

$$-1(3x^2 - 5x - 2) = 0$$

$$-1(3x + 1)(x - 2) = 0$$

$$3x + 1 = 0, x - 2 = 0$$

$$x = -\frac{1}{3}, 2$$

12.

$$x(5x^2 + 29x - 6) = 0$$

$$x(x + 6)(5x - 1) = 0$$

$$x = 0, x + 6 = 0, 5x - 1 = 0$$

$$x = 0, -6, \frac{1}{5}$$

Practice 2

1.

$$x - 9 = 0, x + 3 = 0$$

$$x = 9, -3$$

2.

$$x - 6 = 0$$

$$x = 6$$

3.

$$x = 0, x + 13 = 0, x + 3 = 0$$

$$x = 0, -13, -3$$

4.

$$7x + 1 = 0, 14x + 9 = 0$$

$$x = -\frac{1}{7}, -\frac{9}{14}$$

5.

$$-x = 0, 15x + 2 = 0, 3x - 8 = 0$$

$$x = 0, -\frac{2}{15}, \frac{8}{3}$$

6.

$$6x = 0, 8x - 17 = 0, 5x + 2 = 0$$

$$x = 0, \frac{17}{8}, -\frac{2}{5}$$

7.

$$(x + 7)(x - 2) = 0$$

$$x + 7 = 0, x - 2 = 0$$

$$x = -7, 2$$

8.

$$9(x^2 - 4) = 0$$

$$9(x - 2)(x + 2) = 0$$

$$x - 2 = 0, x + 2 = 0$$

$$x = \pm 2$$

9.

$$(2x - 9)(x + 4) = 0$$

$$2x - 9 = 0, x + 4 = 0$$

$$x = \frac{9}{2}, -4$$

10.

$$2x(x^2 + 5x + 6) = 0$$

$$2x(x + 3)(x + 2) = 0$$

$$2x = 0, x + 3 = 0, x + 2 = 0$$

$$x = 0, -3, -2$$

11.

$$(2x - 3)(4x - 5) = 0$$

$$2x - 3 = 0, 4x - 5 = 0$$

$$x = \frac{3}{2}, \frac{5}{4}$$

12.

$$x(35x^2 + 38x + 8) = 0$$

$$x(7x + 2)(5x + 4) = 0$$

$$x = 0, 7x + 2 = 0, 5x + 4 = 0$$

$$x = 0, -\frac{2}{7}, -\frac{4}{5}$$

Targeted Review

Problem	1	2	3	4	5	6	7	8	9	10	11	12
Lesson Origin	23	23	22	22	19	20	20	19	19	17	22	23

1.

$$(x^2 - 3x) + (25x - 75)$$

$$x(x - 3) + 25(x - 3)$$

$$(x - 3)(x + 25)$$

2.

$$(25x^2 + 10x) + (5x + 2)$$

$$5x(5x + 2) + 1(5x + 2)$$

$$(5x + 2)(5x + 1)$$

3.

$$(6z - 5)^2 \text{ perfect square trinomial}$$

4.

$$\left(\frac{2}{3}r + \frac{4}{5}\right)\left(\frac{2}{3}r - \frac{4}{5}\right) \text{ difference of two squares}$$

5.

$$A_{\text{square}} = (x)(x)$$

$$x^2 \text{ square units}$$

6.

$$A_{\text{rectangle}} = (5x + 6)(2x + 1)$$

$$10x^2 + 17x + 6 \text{ square units}$$

7.

$$A_{\text{shaded region}} = A_{\text{rectangle}} - A_{\text{square}}$$

$$A_{\text{shaded region}} = (10x^2 + 17x + 6) - (x^2)$$

$$A_{\text{shaded region}} = 9x^2 + 17x + 6 \text{ square units}$$

8.

$$2^3 x^3 y^9 \cdot 4x^8$$

$$32x^{11}y^9$$

9.

$$30x^6y^2$$

10.

$$x + y = 4$$

$$x - y = -18$$

Elimination:

$$2x = -14$$

$$x = -7$$

$$(-7) + y = 4$$

$$y = 11$$

The two numbers are -7 and 11 .

11. B

A) $(2x + 9)^2$

B) $(4x + 27)(x + 3)$

C) $(4x + 3)(x + 27)$

D) $(2x + 3)(2x + 27)$

Distractor Rationale:

A) The given expression is not a perfect square trinomial. The middle term would need to be $36x$.C) This will result in a middle term of $111x$.D) This will result in a middle term of $60x$.

$$(4x^2 + 12x) + (27x + 81)$$

$$4x(x + 3) + 27(x + 3)$$

$$(4x + 27)(x + 3)$$

12. C

A) always have two addition symbols.

B) always have two subtraction symbols.

C) always have one addition and one subtraction symbol.

D) cannot be determined.

Distractor Rationale:

A) There cannot be two addition symbols if one of the terms is negative.

B) There cannot be two subtraction symbols if the last term is negative.