# Polynomials

Guided Practice Worksheet

Algebra for Students

## Exploring Polynomial Expressions

1. Determine whether each expression is a polynomial. If the expression is not a polynomial, explain why not. If the expression is a polynomial, classify it as a monomial, a binomial, or a trinomial.

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

   (b) -3

   (c) $4x + 7y - 12$

   (d) $6x^{-3y} + 3x^2 - 5$

   (e) $7x2y$

   (f) $149x^3y^2z - 57xy^2$

2. A rectangular swimming pool has a depth, or height, of 5 feet, and a length that is 20 feet greater than the width.

   (a) Write polynomial expressions for the length and width of the pool.

   length = _____ width = _____

   (b) Use the height of the swimming pool, along with the polynomial expressions for length and width, to write and simplify a polynomial expression for the volume of water in the pool.

   (c) Use the simplified polynomial expression from Question #2b to calculate the volume of water in a pool with the widths listed in the table.

| Pool | Width (ft) | Volume of water ($ft^3$) |
|---|---|---|
| 1 | 17 | |
| 2 | 20 | |
| 3 | 30 | |

3. A homeowner wants to build a walkway that is $x$ feet wide around a rectangular pool with a length of 40 feet and a width of 20 feet.

   (a) Write a polynomial expression for the total area of the pool and walkway. Simplify the expression.

   (b) Use the simplified polynomial expression from Question #3a to calculate the total area needed for a pool with the widths listed in the table.

| Pool | Walkway width (ft) | Area of pool & walkway ($ft^2$) |
|---|---|---|
| 1 | 3 | |
| 2 | 5 | |
| 3 | 8 | |
| 4 | 10 | |

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## Factoring Polynomials

1. A homeowner has 108 one-foot square tiles to make a walkway of equal width on all sides around a rectangular hot tub with a length of 8 feet and a width of 4 feet.

   (a) Write a polynomial expression for the total length and the total width of the hot tub and walkway.

   length = _____ width = _____

   (b) Write a polynomial expression for the total area of the hot tub and walkway. Simplify the expression.

   (c) Write a polynomial expression for the total area of the walkway.

   (d) Use the polynomial expression from Question #1c to write a quadratic equation for the total area of the walkway.

   (e) Factor the quadratic equation from Question #1d and determine the width of the walkway. Check your solution.

2. Solve each equation by factoring. Check your solutions.

   (a) $x^2 - 49 = 0$

   (b) $9x^2 + 24x = -16$

   (c) $4x^2 - 4x + 1 = 0$

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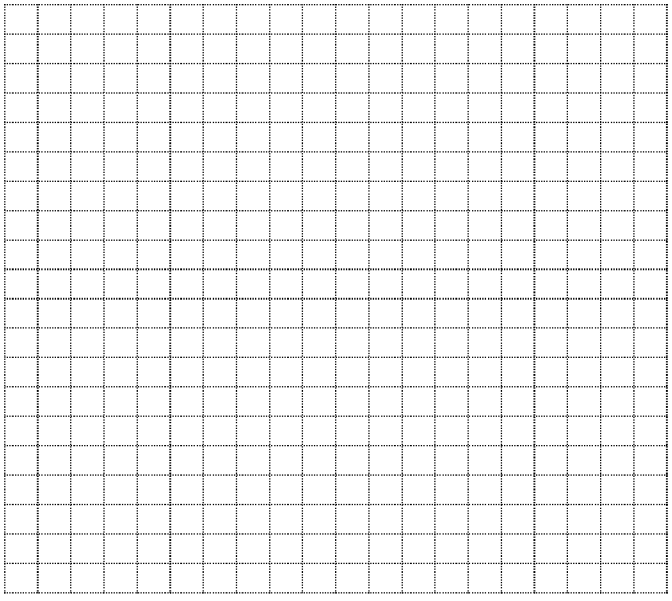
## Graphing Polynomials

The height of a diver after jumping off a diving board can be determined using the equation for general vertical motion, $y = h + vt - \frac{1}{2}at^2$ , where $a$ is the acceleration due to gravity, $h$ is the height from which the diver jumps, $v$ is the diver's upward velocity, and $t$ is the time in seconds.

1. Write an equation that describes the height of a diver who jumps off a 3-meter diving board with an upward velocity of 3.2 m/s. (Note: The acceleration due to gravity is 9.8 $m/s^2$.)

2. Graph the equation for values of t in intervals of one-tenth of a second from $t = 0$ to $t = 1.5$.



3. Approximately when does the diver hit the water? What is the name for this point on the graph?

4. Use a graphing calculator to graph the equation from Question #1. Describe the graphing calculator features that can help you determine as accurately as possible when the diver hits the water.