

Prerequisite Skills

Key Features of Quadratic Functions

Consider the function $y = x^2 - 7x + 12$.

1. **a)** Create a table of values and graph the function.
 - b)** Describe the shape of the graph. What type of function is this?
 - c)** Find the first and second differences. Explain how this supports your answer to part b).
2. Refer to the function in question 1. Identify the
 - a)** x -intercepts
 - b)** y -intercept
 - c)** direction of opening
 - d)** equation of the axis of symmetry
 - e)** coordinates of the vertex
 3. Sketch the graph of a parabola whose vertex is at $(1, -4)$ and whose x -intercepts are -1 and 3 .

Expand and Simplify Algebraic Expressions

4. Use algebra tiles to expand $3(2x - 1)$.
5. Expand, using the distributive property.
 - a)** $4(x + 3)$
 - b)** $-3(y - 5)$
 - c)** $x(x + 7)$
 - d)** $2m(3m - 4)$
 - e)** $6(x^2 + 2x - 1)$
 - f)** $-\frac{1}{2}(2k^2 - 4k + 6)$
6. **a)** Use algebra tiles to model each expression.
 - i)** $x + 1$ **ii)** $x + 3$
- b)** Use algebra tiles to build a rectangle with length $x + 1$ and width $x + 3$.
- c)** What is the area of the rectangle?

7. Expand and simplify.
 - a)** $(x + 3)(x + 5)$
 - b)** $(u - 2)(u + 3)$
 - c)** $(k + 5)(k - 5)$
 - d)** $(2p - 8)(p + 3)$
 - e)** $(2g + 5)^2$
 - f)** $(3d - 1)^2$
8. Expand and simplify.
 - a)** $2(x + 2) + 5(x - 4)$
 - b)** $v(v - 2) - 2v(4v + 3)$
 - c)** $(y + 5)(y - 2) + (y - 3)(y + 1)$
 - d)** $(2n - 1)^2 + 2(n + 3)$

Factors of Polynomials

9. **a)** Select algebra tiles to represent the polynomial $3x + 6$.
 - b)** Arrange the tiles to form a rectangle.
 - c)** What are the expressions for the length and width of the rectangle?
 - d)** Explain how this model illustrates how to factor $3x + 6$.
10. Use algebra tiles to show the factors of each polynomial.
 - a)** $2x + 6$
 - b)** $3x + 12$
 11. Factor out the greatest common factor.
 - a)** $2x + 16$
 - b)** $6h - 36$
 - c)** $c^2 + 3c$
 - d)** $3y^2 - 9y$
 - e)** $3m^2 + 9m + 6$
 - f)** $2r^2 + 4r - 8$
 12. Factor each trinomial.
 - a)** $x^2 + 3x + 2$
 - b)** $m^2 - 9m + 8$
 - c)** $y^2 + 6y + 9$
 - d)** $p^2 + p - 6$