

Section 1.6 Sketch Graphs Using Transformations

- For each parabola, write:
 - the coordinates of the vertex
 - the equation of the axis of symmetry
 - the direction of opening
 - the range of the function
 - $f(x) = -4x^2 + 30$
 - $f(x) = -7(x - 4)^2$
 - $f(x) = 7(x - 4)^2 - 18$
 - $f(x) = -2(x + 3)^2 + 32$
- Describe the graph of each function in terms of transformations on the graph of $y = x^2$. Then, sketch the graph. Clearly label the vertex, the axis of symmetry, and one other point.
 - $y = 3(x - 3)^2$
 - $f(x) = -x^2 + 3$
 - $g(x) = 2(x - 2)^2 - 4$
 - $h(x) = -4(x + 1)^2 - 1$
- The graph of $f(x) = x^2$ has been stretched vertically by a factor of 5 and translated 2 units to the right and 4 units down.
 - Write the equation of the graph of resulting from the transformations.
 - Sketch the graph of $f(x) = x^2$ and its image after the transformations.
- The graph of $f(x) = x^2$ has been stretched vertically by a factor of 3 and translated 3 units to the left and 4 units down.
 - Write the equation of the graph of resulting from the transformations.
 - Sketch the graph of $f(x) = x^2$ and its image after the transformations.
- Write an equation of a parabola that satisfies each set of conditions.
 - vertex $(4, -2)$
congruent in shape to the graph of $y = 2x^2$
range: $\{y \in \mathbf{R} \mid y \leq -2\}$
 - vertex $(-1, 0)$
 y -intercept: 2
- Describe how the graphs of the three functions are related.
 - $f(x) = (x - 2)^2 - 2$
 - $g(x) = 3(x - 2)^2 - 2$
 - $h(x) = -(x - 2)^2 - 2$
 - Sketch the three graphs to verify your answer in part a).
- Write the coordinates of two points other than the vertex on the graph of $f(x) = 3x^2$.
 - Explain how these points can help you to draw the graph of $g(x) = 3(x - 6)^2 - 10$.
 - Graph the function $g(x) = 3(x - 6)^2 - 10$. Label the vertex and the axis of symmetry and write the domain and range.
- The path of a ball thrown from a cliff is modelled by the quadratic function $h(t) = -4.9(t - 1)^2 + 35$.
 - From what height is the ball thrown?
 - What is the maximum height of the ball and when does this occur?
 - Write the range of the function.
 - Graph the function. Determine how long it takes the ball to land.
 - Write the domain of the function.