

## Section 1.5 Translations of Functions

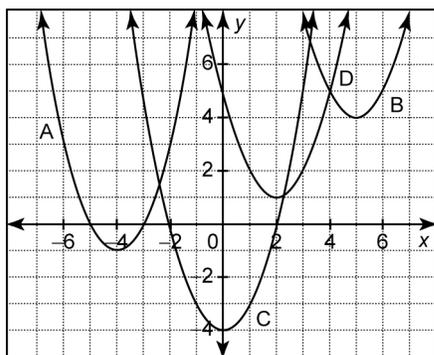
1. Match each equation to the corresponding graph.

a)  $f(x) = (x - 2)^2 + 1$

b)  $g(x) = (x + 4)^2 - 1$

c)  $h(x) = (x - 5)^2 + 4$

d)  $k(x) = x^2 - 4$



2. Write an equation for the graph resulting from each transformation.
- The graph of  $f(x) = x^2$  is translated 2 units to the right.
  - The graph of  $g(x) = x^2$  is translated 2 units up.
  - The graph of  $p(x) = x^2$  is translated 3 units to the left.
  - The graph of  $q(x) = x^2$  is translated 3 units down.
3. Write the coordinates of the vertex in each graph. Then, sketch the graph.
- $f(x) = x^2 - 9$
  - $g(x) = (x + 2)^2$
  - $h(x) = (x + 1)^2 + 4$
  - $k(x) = (x - 2)^2 - 4$
4. Write the coordinates of the vertex in each graph.
- $f(x) = x^2 - 16$
  - $g(x) = (x + 1)^2$
  - $h(x) = (x + 2)^2 + 3$
  - $k(x) = (x - 4)^2 - 1$
5. a) Sketch the graphs for the functions  $y = x^2 - 2$ ,  $y = x^2 - 3$ , and  $y = x^2 - 6$  on the same set of axes.
- b) Each of the three functions in part a) is translated 2 units to the left. What are the new equations of the functions?
- c) Each of the three functions in part a) is translated 2 units to the right. What are the new equations of the functions?
6. The  $x$ -intercepts of a parabola that opens upward are  $-4$  and  $-2$ .
- What is the  $x$ -coordinate of the vertex?
  - Find the equation of the parabola in the form  $p(x) = (x - h)^2 + k$ .
7. The  $x$ -intercepts of a parabola that opens upward are 2 and 6.
- What is the  $x$ -coordinate of the vertex?
  - Find the equation of the parabola in the form  $p(x) = (x - h)^2 + k$ .
8. The  $x$ -intercepts of a parabola that opens upward are  $-3$  and  $-7$ .
- What is the  $x$ -coordinate of the vertex?
  - Find the equation of the parabola in the form  $p(x) = (x - h)^2 + k$ .
9. Two identical dragsters are ready to start a race. One gives the other a 3-s head start. How are the position-time graphs for the two dragsters alike? How are they different?