Section 4.5 Interpret Graphs of Quadratic Relations

1. Find the initial value for each relation.

   a) $y = -12x^2 + 5x + 6$
   b) $y = 30(x - 5)^2 + 7$
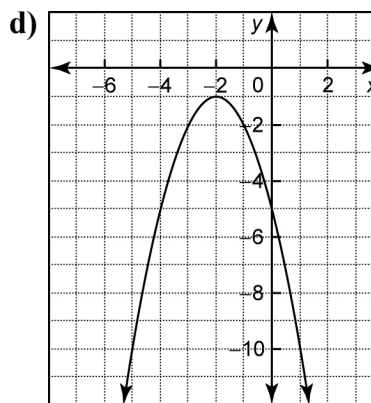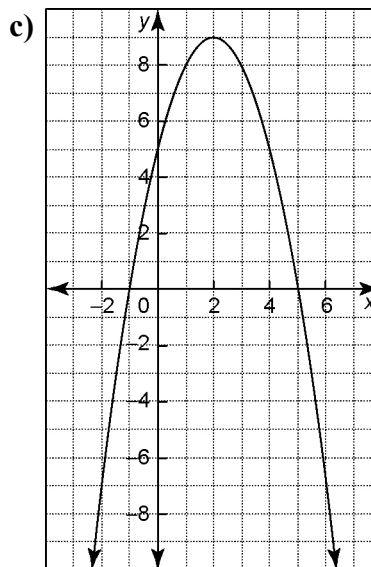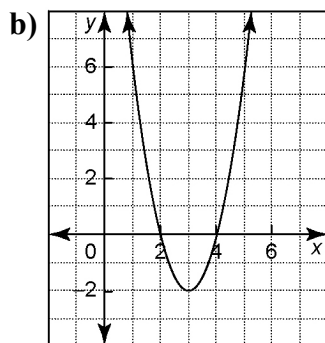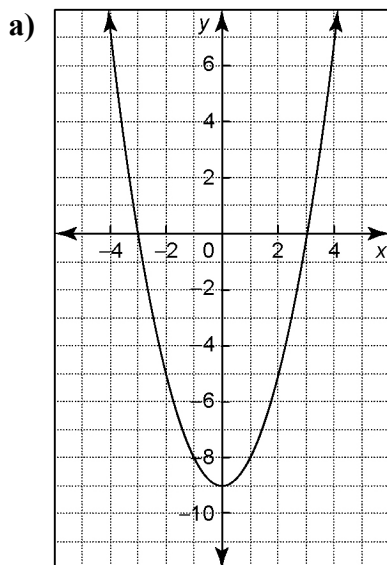   **c)** $y = 10x^2 + 7x - 9$
   d) $y = -0.5x^2 + 0.3x - 60$

2. For each parabola, identify
   i) the x-intercepts
   ii) the y-intercept
   iii) the minimum or maximum value
   iv) the coordinates of the vertex

a)

b)
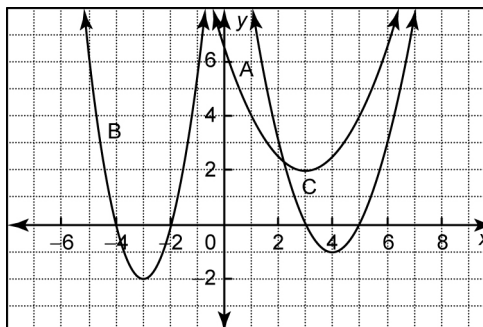
c)

d)

3. Match each relation with its graph.

   a) $y = 0.5(x - 3)^2 + 2$
   b) $y = 2(x + 3)^2 - 2$
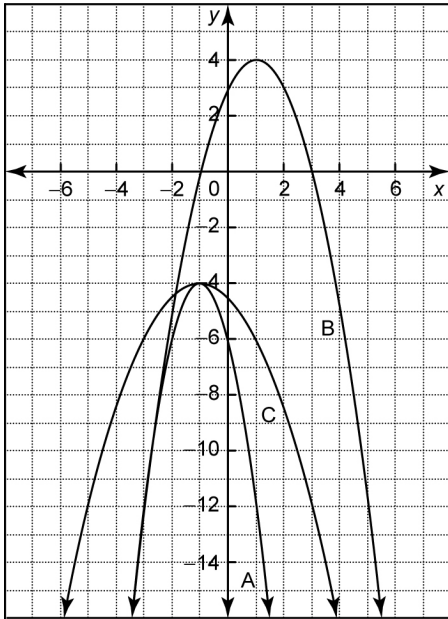   **c)** $y = (x - 4)^2 - 1$

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4. Match each relation with its graph.
   a) $y = -2(x + 1)^2 - 4$
   b) $y = -(x - 1)^2 + 4$
   c) $y = -0.5(x + 1)^2 - 4$

5. A pebble is fired from a sling shot from the top of a small hill. The path of the pebble can be modelled by the relation $h = -5.25(t - 4)^2 + 96$, where h is the height of the pebble in metres and t is the time in seconds after the pebble was fired.
   a) Find the vertex of the parabola.
   b) How long will it take the pebble to reach its maximum height?
   c) What is the maximum height?
   d) What is the height of the small hill?

6. A golf ball is hit from the top of a cliff and fell to the green located at the bottom of the valley. The path of the golf ball can be modelled by the relation $h = -5(t - 5)^2 + 60$ where h is the height in metres above the valley and t is the time after the ball was hit, in seconds.
   a) What is the maximum height of the golf ball?
   b) How long does it take the golf ball to reach its maximum height?
   c) What is the height of the ball after 3 s?
   d) What is the height of the ball after 7 s?
   e) What do you notice about your answers to parts c) and d)? Explain.
   f) What is the height of the cliff?

7. a) Graph the relation $y = 2(x - 3)^2 + 1$ using the vertex and four other points.
   b) Graph the relation $y = 2x^2 - 12x + 19$ using a table of values.
   c) What do you notice about the two graphs? Explain.