### Chapter 2.5  Check Your Understanding

#### Exercises 1–5  True or False. Give reasons.

1. If we translate the graph of $y = x^2$ two units to the right and one unit down, the result will be the graph of $y = x^2 - 4x + 3$.

   **Answer:**
   True; $y = (x - 2)^2 - 1 = x^2 - 4x + 4 - 1 = x^2 - 4x + 3$.

2. The $y$-intercept point for the graph of $y = x^2 + x - 3$ is above the $x$-axis.

   **Answer:**
   False; the $y$-intercept point is $(0, -3)$, below the $x$-axis.

3. The maximum value of $f(x) = 15 - 2x - x^2$ is 12.

   **Answer:**
   False; the vertex is $(-1, 16)$, so the maximum value is 16.

4. The graphs of $y = x^2 - 5x - 4$ and $y = 8 + 3x - x^2$ intersect at points in Quadrants II and IV.

   **Answer:**
   True; draw graphs of $y_1 = x^2 - 5x - 4$ and $y_2 = 8 + 3x - x^2$.

5. If we translate the graph of $y = x^2$ three units down it will be the graph of $y = 2x^2 - 6$.

   **Answer:**
   False; Check $x = 0$. $y = 2(0)^2 - 6 = -6$ which is 6 units down, not 3.

#### Exercises 6–8  Fill in the blank so that the resulting statement is true. The number of points at which the two graphs intersect is__________.

6. $f(x) = x^2 - 5x - 5$, $g(x) = 8 + 3x - x^2$

   **Answer:**
   Draw graphs of $y = x^2 - 5x - 5$ and $y_2 = 8 + 3x - x^2$.

7. $f(x) = 3 + 3x - x^2$, $g(x) = 8 - x$

   **Answer:**
   The graphs intersect at no points.
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<td>8.</td>
<td>$f(x) = 3 + 3x - x^2$, $g(x) =</td>
<td>x - 2</td>
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**Exercises 9–10** Draw a graph of function $f$ using a $[-10, 10]$ by $[-10, 10]$ window. The number of $x$-intercept points visible in this window is.

9. $f(x) = 0.3x^2 - 4x - 1$
   **Answer:**
   The graphs intersect at one point.

10. $f(x) = 3 - 3x - 0.3x^2$
    **Answer:**
    Only one $x$-intercept is visible in the window but we know there are two.