Complete without a calculator.

For each function listed:
- State the equation for the axis of symmetry.
- State the vertex, \( y \)-intercept, domain, range.
- Graph the parabola.

1. \( f(x) = x^2 + 4x + 8 \)  
2. \( f(x) = -x^2 - 6x - 2 \)  
3. \( f(x) = 2x^2 - 5 \)  
4. \( f(x) = 2 - 6x - 3x^2 \)  

For each function listed:
- Determine whether it has a maximum or minimum value.
- State the maximum or minimum value of the function.
- State where the maximum or minimum value of the function occurs.

5. \( f(x) = 2x^2 + 8x - 3 \)  
6. \( f(x) = -4x^2 + 12 \)  
7. \( f(x) = x^2 - 10x \)  
8. \( f(x) = -6x - 3x^2 - 4 \)  

Solve each quadratic equation by graphing. If exact roots cannot be found, state the consecutive integers between which each root lies.

9. \( 2x^2 - 4x = 0 \)  
10. \( -x^2 - 5 = -6x \)  
11. \( 2x^2 + 9 - 8x = 0 \)  
12. \( \frac{1}{20}x^2 + \frac{3}{5}x + \frac{1}{2} = 0 \)  

Use the table to determine the location of the zeros of the quadratic function.

<table>
<thead>
<tr>
<th>( x )</th>
<th>-4</th>
<th>-3</th>
<th>-2</th>
<th>-1</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>( f(x) )</td>
<td>18</td>
<td>5</td>
<td>-4</td>
<td>-9</td>
<td>-10</td>
<td>-7</td>
<td>0</td>
<td>11</td>
</tr>
</tbody>
</table>

Here are some tiny blank grids for you to practice # 1 - 4, 9 - 12
14. The length of a Ping-Pong table is 3 feet more than twice the width. The area of the Ping-Pong table is 90 square feet. What are the dimensions of the Ping-Pong table?

15. The function \( R = -3p^2 + 60p + 1060 \) models the daily revenue for a company that makes DVDs, where \( R \) is the revenue and \( p \) is the price per DVD.

   a. If the company charged $16 per DVD, how much would they make each day?

   b. What is the maximum amount that they can make per day?

ANSWERS

1. \( A.o.S. \ x = -2 \)
   
   Vertex \((-2, 4)\)
   
   \( y\)-intercept = 8
   
   domain: \((-\infty, \infty)\)
   
   range: \([4, \infty)\)

2. \( A.o.S. \ x = -3 \)
   
   Vertex \((-3, 7)\)
   
   \( y\)-intercept = -2
   
   domain: \((-\infty, \infty)\)
   
   range: \((-\infty, 7]\)

3. \( A.o.S. \ x = 0 \)
   
   Vertex \((0, -5)\)
   
   \( y\)-intercept = -5
   
   domain: \((-\infty, \infty)\)
   
   range: \([-5, \infty)\)

4. \( A.o.S. \ x = -1 \)
   
   Vertex \((-1, 5)\)
   
   \( y\)-intercept = 2
   
   domain: \((-\infty, \infty)\)
   
   range: \((-\infty, 5]\)

5. minimum; -11; at \( x = -2 \)

7. minimum; -25; at \( x = 5 \)

9. \( x = 0, 4 \)

11. No REAL solution

13. \( x \) is between \(-3\) and \(-2\); \( x = 2 \)

14. 6 feet by 15 feet

15. a) $1252       b) $1360