Determine whether the graph will open up or down, find the coordinate of the vertex, find the line of symmetry, find the x-intercepts and graph each of the following.

1. \( f(x) = x^2 + 8x + 15 \)
   - Opens: 
   - Vertex: 
   - Axis of Sym: 
   - X-Int:

2. \( f(x) = -x^2 - 2x + 8 \)
   - Opens: 
   - Vertex: 
   - Axis of Sym: 
   - X-Int:

3. \( f(x) = -x^2 + 4x - 5 \)
   - Opens: 
   - Vertex: 
   - Axis of Sym: 
   - X-Int:

4. \( f(x) = x^2 - 4x + 4 \)
   - Opens: 
   - Vertex: 
   - Axis of Sym: 
   - X-Int:
5. \( f(x) = x^2 + 2 \)
   Opens:
   Vertex:
   Axis of Sym:
   X-Int:

6. \( f(x) = -x^2 + 5 \)
   Opens:
   Vertex:
   Axis of Sym:
   X-Int:

7. \( f(x) = x^2 + 6x \)
   Opens:
   Vertex:
   Axis of Sym:
   X-Int:

8. \( f(x) = x^2 - 6x + 4 \)
   Opens:
   Vertex:
   Axis of Sym:
   X-Int:
9. \( f(x) = -2x^2 + 4x - 5 \)

Opens:

Vertex:

Axis of Sym:

X-Int:

10. (Problem 31 from section 10.6): A charter flight charges a fare of $200 per person plus $4 per person for each unsold seat on the plane. If the plane holds 100 passengers and if \( x \) represents the number of unsold seats, find the following.

   a. A function defined by \( R(x) \) that describes the total revenue received for the flight (Hint: multiply the number of people flying, \( 100-x \), by the price per ticket, \( 200+4x \))

   b. The number of unsold seats that will produce the maximum revenue

   c. The maximum revenue.
11. Joe owns a hot dog stand. He has found that his profit can be represented by the equation \( P(x) = -x^2 + 78x + 80 \) where \( P \) represents his profit and \( x \) represents the number of hot dogs sold.
   
   d. How many hot dogs must he sell to earn the most profit?

   e. What is his maximum profit?