Graphing Quadratics - Practice (and solutions)

The graph of a quadratic function, \( f(x) = ax^2 + bx + c \), is a parabola:

1. The axis of symmetry is the line

\[
x = \frac{-b}{2a}
\]

2. The vertex lies on the axis of symmetry. The \( y \)-coordinate of the vertex is

\[
f \left( \frac{-b}{2a} \right)
\]

3. If \( a > 0 \) the parabola opens upward. If \( a < 0 \) the parabola opens downward.

4. The \( x \)-intercept(s), if any, are found by setting \( f(x) = 0 \), and solving \( ax^2 + bx + c = 0 \)

5. To find the \( y \)-intercept, set \( x = 0 \) and solve for \( y \).

6. If the parabola opens upward, then the \( y \)-value at the vertex is a minimum value.

   If the parabola opens downward, then the \( y \)-value at the vertex is a maximum value.

For each function, find the axis of symmetry, vertex, \( y \)-intercept, and \( x \)-intercept(s), if any. Determine the domain and range for the function. State whether the function has a relative maximum or minimum, and state the value of the max or min. Sketch the graph of the equation.
1. \( f(x) = x^2 - 6x + 7 \)  
2. \( g(x) = 3x^2 + 2 \)  
3. \( y = x^2 + 6x - 5 \)  
4. \( h(t) = -t^2 - 4t + 12 \)  
5. \( k(x) = 4x - 6 + 2x^2 \)  
6. \( f(x) = -2x^2 + 7x - 5 \)  
7. \( f(x) = 3x^2 + 2x + 2 \)  
8. \( y = x^2 - 6x + 5 \)  
9. \( s(t) = -16t^2 + 48t + 8 \)  
10. \( f(x) = x^2 + 2x - 8 \)  
11. \( f(x) = -x^2 + 6x - 8 \)  
12. \( f(x) = 6 + 2x - x^2 \)  
13. \( f(x) = -2x^2 + x + 1 \)