Complete the square to write each function in standard form. Identify the coordinates of the vertex.

1. $f(x) = 4x^2 - 16x + 7$

2. $f(x) = x^2 + 2x + 3$

3. $f(x) = 2x^2 - 16x + 31$

4. $f(x) = -4x^2 + 24x - 41$

Graph the following functions. Be sure to mark the following points on your graphs :

- x-intercepts
- y-intercept
- axis of symmetry
- vertex
- **State whether there are 2 real roots, 1 real root, or imaginary roots**

1. $f(x) = x^2 + 6x - 7$

2. $f(x) = 2x^2 - x + 1$

3. $f(x) = \frac{1}{2}x^2 + 2x$

4. $f(x) = \frac{2}{3}x^2 + 2x + 3$

5. $f(x) = x^2 + 2x + 1$

6. $f(x) = 4x^2 - 24x + 32$

7. $f(x) = 3x^2 + 2x + 6$

8. $f(x) = \frac{1}{4}x^2 + 5x + 25$

9. $f(x) = -\frac{1}{2}x^2 + 4x - 6$

10. $f(x) = -2x^2 - 7x - 8$