3.1 and 3.2 Properties of Quadratic Functions - Assignment

1. A stone is thrown into the air from a bridge over a river. It falls into the river. The height of the stone, h meters, above the water t seconds after the stone is thrown is modelled by the equation: $h = -3t^2 + 18t + 48$.
    a. How high is the bridge? (1 mark K)

    b. How long does it take the stone to hit the water?
        Determine this value two ways:

Factoring (4 marks A)	The Quadratic Formula (6 marks K)

    c. What is the maximum height reached by the stone and when does this occur? Determine this value two ways.
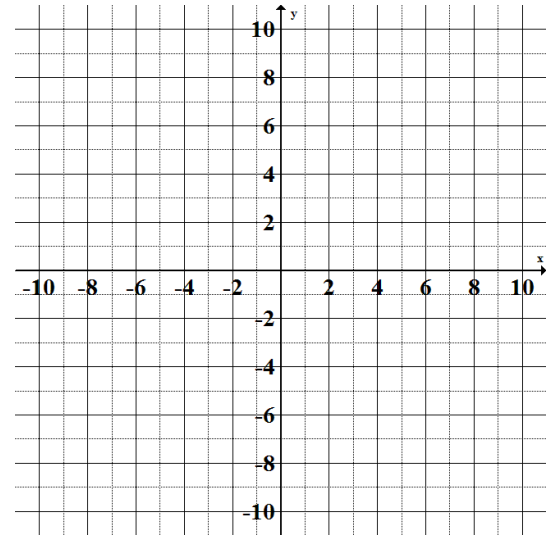
Completing the Square (6 marks A)	Using your Factored Form Equation from part b (4 marks A)

    d. Determine the domain and range of the function in this situation. (4 marks K)

2. Given $f(x) = -3(x - 3)^2 + 7$, state the vertex, axis of symmetry, direction of opening, y-intercept, step pattern, domain and range. Graph the function. (8 marks K, 6 marks A)

3. Given f(x) = 2(x + 1) (x – 3), state the vertex, axis of symmetry, direction of opening, y-intercept, and step pattern. (4 marks K, 5 marks A)

4. Given a function with vertex (-3, -8) and zeros x = 1 and -7, state the equation of the function in:

a. Vertex Form (5 marks A)   b. Factored Form (3 marks K)

c) Standard Form (4 marks K)

5. Determine the vertex form equation and standard form equation of the parabola with zeros at x = 5, -3 that goes through the point (7, -5). (10 marks T)

6. Mr. Gilbert thinks he's sooo great. He has been bragging lately that he can just look at the vertex form equation of any parabola and determine if the function has **one zero**, **no zeros** or **two zeros** without doing any math! Explain how he does it. Be sure to include an explanation of how he determines each of the three cases. (10 marks C)

$$\overline{30\;K} \quad \overline{30\;A} \quad \overline{10\;T} \quad \overline{10\;C}$$