Quiz #5

> READ AND FOLLOW ALL DIRECTIONS. CIRCLE YOUR FINAL ANSWERS.
> SHOW ALL WORK TO RECEIVE FULL CREDIT. NO CALCULATORS.

1. (10 points) Let $f(x) = -3x^2 + 12x - 9$

   (a) Circle the correct option:

   The graph of f (opens up / opens down) and has a (highest / lowest) point.

   (b) Find the vertex of the graph of $f(x)$.

   (c) Find the x-intercept(s) of $f(x)$.

   (d) Find the y-intercept of $f(x)$

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2. (6 points) Let $f(x) = 2x^2 - 12x + 18$

    (a) Find the vertex of the graph of $f(x)$.

    (b) What is the axis of symmetry of the graph of $f(x)$?

3. (4 points) Determine the quadratic function with vertex $(1, -3)$ which passes through the point $(3, 5)$. (Your answer should be of the form $f(x) = a(x - h)^2 + k$ where you supply a, h, and k).

4. (2 points) Can a quadratic function have a range of $(-\infty, \infty)$? Justify your answer.