

NAME: _____ Score _____/10

Please **print** your name

All calculations are to be exact. NO DECIMALS.
If you use a formula, write the formula before using it.

1. Find the rule for the function whose graph is the line through (0,5) with slope 3.

Because we are given the slope and the y-intercept we can simply replace m and b in the general form $f(x) = mx + b$ to obtain $f(x) = 3x + 5$ as the rule for the desired function.

2. What is the vertex of the graph of the quadratic function whose rule is $f(x) = x^2 - 6x + 1$

$$\text{The vertex is } \left(-\frac{b}{2a}, f\left(-\frac{b}{2a}\right) \right) = \left(\frac{6}{2}, f\left(\frac{6}{2}\right) \right) = (3, f(3)) = (3, 9 - 18 + 1) = (3, -8)$$

For questions 3, 4, and 5, refer to the graph at the right.
CORRECTION: The x-intercept labeled (3/5, 0) should clearly be labeled (8/5, 0)

3. For what values of x is $f(x) = 0$?

$$f(x) = 0 \text{ for } x \in \left\{ -1, -\frac{3}{5}, 1, \frac{8}{5} \right\}$$

4. For what values of x is $f(x) < 0$?

$$f(x) < 0 \text{ for } x \in \left(-1, -\frac{3}{5} \right) \cup \left(1, \frac{8}{5} \right)$$

5. For what values of x is $f(x) > 0$?

$$f(x) > 0 \text{ for } x \in (-\infty, -1) \cup \left(-\frac{3}{5}, 1 \right) \cup \left(\frac{8}{5}, \infty \right)$$

