

NAME: Solution

MAC 1147 Section 3079  
Quiz Six

Please show all of your work in a NEAT and ORGANIZED fashion.

1. (a) (2 points) Write the standard form of the quadratic function  $f(x)$  that has vertex  $(-2, -6)$  and passes through the point  $(-1, -3)$ .

$$\begin{aligned} f(x) &= a(x-h)^2 + k & -3 &= a(-1+2)^2 - 6 \\ f(x) &= a(x+2)^2 - 6 & 3 &= a(1^2) \\ f(x) &= 3(x+2)^2 - 6 & a &= \frac{3}{1} = 3 \end{aligned}$$

- (b) (1 point) Find the  $x$ -intercept(s) of the graph of  $f(x)$ .

$$\begin{aligned} 3(x+2)^2 - 6 &= 0 \\ 3(x+2)^2 &= 6 \\ (x+2)^2 &= 2 \\ x+2 &= \pm\sqrt{2} \rightarrow x = -2 \pm \sqrt{2} \end{aligned}$$

2. (3 points) Use the functions  $f(x) = x + 4$  and  $g(x) = 2x - 5$  to find the function  $(g \circ f)^{-1}$ .

$$\begin{aligned} (g \circ f)(x) &= & (g \circ f)(x) &= 2x + 3 \\ g(f(x)) &= & \rightarrow x &= 2y + 3 \\ g(x+4) &= & x-3 &= 2y \\ 2(x+4) - 5 &= & (g \circ f)^{-1} &= \frac{1}{2}x - \frac{3}{2} \\ 2x + 8 - 5 &= 2x + 3 \end{aligned}$$

3. (3 points) Find the rational zeros of the function  $g(x) = 3x^3 + 2x^2 - 7x + 2$ .

List of possible zeros:  $\pm \frac{1, 2}{1, 3}$

$$\begin{array}{r|rrrr} 3 & 2 & -7 & 2 & \\ & 3 & 5 & -2 & \\ \hline 3 & 5 & -2 & 0 & \checkmark \end{array}$$

$$\begin{aligned} 3x^2 + 5x - 2 &= 0 \\ 3x^2 + 6x - x - 2 &= 0 \\ 3x(x+2) - (x+2) &= 0 \\ (3x-1)(x+2) &= 0 \\ x = \frac{1}{3}, -2 &\rightarrow \boxed{-2, \frac{1}{3}, 1} \end{aligned}$$