

NAME: Solution

MAC 1147 Section 3089  
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  $(-3, 4)$  and passes through the point  $(-1, -12)$ .

$$\begin{aligned} f(x) &= a(x-h)^2 + k & -12 &= a(-1+3)^2 + 4 \\ f(x) &= a(x+3)^2 + 4 & -16 &= a(2^2) \\ f(x) &= -4(x+3)^2 + 4 & a &= -\frac{16}{4} = -4 \end{aligned}$$

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

$$\begin{aligned} -4(x+3)^2 + 4 &= 0 \\ -4(x+3)^2 &= -4 \\ (x+3)^2 &= 1 \\ x+3 &= \pm 1 \longrightarrow x = -3 \pm 1 \longrightarrow x = -2, -4 \end{aligned}$$

2. (3 points) Use the functions  $f(x) = \frac{1}{8}x - 3$  and  $g(x) = x^3$  to find the function  $g^{-1} \circ f^{-1}$ .

$$\begin{aligned} f(x) &= \frac{1}{8}x - 3 & g(x) &= x^3 & (g^{-1} \circ f^{-1})(x) &= \\ \rightarrow x &= \frac{1}{8}y - 3 & \rightarrow x &= y^3 & g^{-1}(f^{-1}(x)) &= \\ x+3 &= \frac{1}{8}y & g^{-1}(x) &= \sqrt[3]{x} & g^{-1}(8x+24) &= \\ f^{-1}(x) &= 8x+24 & & & \sqrt[3]{8x+24} &= \end{aligned}$$

3. (3 points) Find the rational zeros of the function  $g(x) = 2x^3 + 3x^2 - 14x - 15$ .

List of possible zeros:  $\pm \frac{1, 3, 5, 15}{1, 2}$

$$\begin{array}{r|rrrr} -1 & 2 & 3 & -14 & -15 \\ & & -2 & -1 & 15 \\ \hline & 2 & 1 & -15 & 0 \end{array} \checkmark$$

$$\begin{aligned} 2x^2 + x - 15 &= 0 \\ 2x^2 + 6x - 5x - 15 &= 0 \\ 2x(x+3) - 5(x+3) &= 0 \\ (2x-5)(x+3) &= 0 \end{aligned}$$

$$x = \frac{5}{2}, -3 \longrightarrow$$

$$\boxed{-3, -1, \frac{5}{2}}$$