Directions: Please answer the following questions and make sure your answer are legible. You must show your work to receive credit for your answers. You may not use a calculator (or any other technology) on this quiz. Good Luck.

1. (4 points) Write the set using interval notation:
   
   (a) \{x | x \leq -3 \text{ or } x > 0\}  
   \[ (-\infty, -3] \cup (0, \infty) \]  
   
   (b) \{x | x \leq 5 \text{ or } x = 6\}  
   \[ (-\infty, 5] \cup \{6\} \]  

2. (6 points) Let \( P(\sqrt{2}, \sqrt{3}) \) and \( Q(-\sqrt{8}, -\sqrt{12}) \) be 2 points on the coordinate plane.

   (a) Find the distance between \( P \) and \( Q \). Simplify your answer
   \[ d = \sqrt{(\sqrt{2} + \sqrt{8})^2 + (\sqrt{3} + \sqrt{12})^2} \]
   \[ d = \sqrt{(\sqrt{2} + 2\sqrt{2})^2 + (\sqrt{3} + 2\sqrt{3})^2} \]
   \[ d = \sqrt{(3\sqrt{2})^2 + (3\sqrt{3})^2} \]
   \[ d = \sqrt{9 \cdot 2 + 9 \cdot 3} \]
   \[ d = \sqrt{9 \cdot 5} \]
   \[ d = 3\sqrt{5} \]  

   (b) Find the midpoint \( M \) between \( P \) and \( Q \). Simplify your answer
   \[ M = \left( \frac{\sqrt{2} - \sqrt{8}}{2}, \frac{\sqrt{3} - \sqrt{12}}{2} \right) \]

3. (4 points) Find all of the points on the \( x \)-axis which are 2 units from the point \((-1, 1)\).

   \[ d = \sqrt{(x - 0)^2 + (x + 1)^2} \]
   \[ d = \sqrt{1 + (x + 1)^2} \]
   \[ d^2 = 1 + (x + 1)^2 \]
   \[ \sqrt{2} = \sqrt{1 + (x + 1)^2} \]
   \[ 2 = 1 + (x + 1)^2 \]
   \[ x + 1 = \sqrt{2} \text{ or } x + 1 = -\sqrt{2} \]
   \[ x = -1 + \sqrt{2} \text{ or } x = -1 - \sqrt{2} \]

   Points: \((-1 + \sqrt{2}, 0), (-1 - \sqrt{2}, 0)\)

(turn over)
4. (3 points) Graph the relation \( \{(m, 2m) \mid m = 0, \pm 1, \pm 2\} \)

5. (8 points) Find the \( x\)- and \( y\)-intercepts of the following graphs. If there are none, say ‘none,’

(a) \( y = x^2 - 2x - 8 \)

(b) \( y = 2\sqrt{x + 4} - 2 \)