Quiz 2

No notes or calculators. Show all work.

1. (3 points) Let $f(x) = \sqrt{3x^2 - 27}$. What is the domain of f(x).

Answer: the function "inside" a square root must be ≥ 0 .

$$\begin{array}{lll} 3x^2-27\geq 0\\ 3x^2\geq 27\\ x^2\geq 9 & \rightarrow & |x|\geq 3 & \rightarrow & x\geq 3 \text{ and } x\leq -3 \end{array}$$

In interval notation, the domain is $(\infty, -3] \cup [3, \infty)$

2. (4 points) Find the *y*-intercept and *x*-intercepts of the quadratic equation below.

$$f(x) = x^2 - 6x + 8$$

Answer:

y-intercept
$$\Rightarrow x = 0$$

 $y = 0^2 - 0 + 8 = 8 \rightarrow (0, 8)$

x-intercept $\Rightarrow y = 0$ $0 = x^2 - 6x + 8 = (x - 4)(x - 2) \rightarrow x = 4, x = 2 \rightarrow (4, 0), (2, 0)$ or you can use the quadratic formula

3. (3 points) The rational function below has a hole. Determine the location of the hole (your answer should be a point).

$$f(x) = \frac{x^2 + 4x - 5}{x - 1}$$

Answer: We can factor the numerator and simplify the rational function.

$$f(x) = \frac{x^2 + 4x - 5}{x - 1} = \frac{(x - 1)(x + 5)}{(x - 1)} = x + 5 \quad \text{with a hole occurring at } x = 1$$

The location of the hole is a point on the graph. We have to use f(x) = x + 5 since the rational function is <u>undefined</u> at x = 1 (where the hole is).

$$y = f(1) = 1 + 5 = 6$$

So the hole is at (1,6)