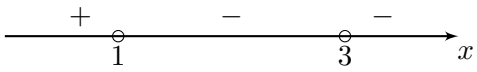
Quiz # 3

Directions: Carefully read each question below and answer to the best of your ability in the space provided. You **MUST** show your work to receive full credit!

1. (5 points) Solve the following inequality, and state your answer in interval notation:

$$(1-x)(x-3)^2 > 0.$$

Solution: First, consider the equality $(1-x)(x-3)^2 = 0$, which using the zero product property has solutions $x = 1$ and $x = 3$. Now put those values on the number line and determine signs. That's



Thus, the solution to our inequality is an interval $(-\infty, 1)$.

2. (5 points) Find the domain of the following functions. Express your answer in interval notation.

Solution:

1. $f(x) = x^3 + \sqrt[3]{x} + x - 1$ function doesn't have any division by zero or negatives under the even root, thus the domain is the whole real line, or $\mathbb{R}$, or $(-\infty, \infty)$.

2. $g(x) = \dfrac{x^2}{x}$ function has a problem with division by zero, thus we have to exclude it from our domain, and domain is $\mathbb{R} - \{0\}$ or $(-\infty, 0) \cup (0, \infty)$.

3. $h(x) = \sqrt{5-x}$ function has a square root, thus expression under the square root has to be positive that is $5 - x \geq 0$ or $5 \geq x$. Thus the domain is $x \leq 5$ or $(-\infty, 5]$.

3. (5 points) Let

$$f(x) = \begin{cases} x^3 & \text{if } x < 2 \\ x + 6 & \text{if } x \geq 2 \end{cases}$$

Solution:

1. Find $f(0)$. Since $0 < 2$, then $f(0) = 0^3 = 0$.

2. Find $f(3)$. Since $3 \geq 2$, then $f(3) = 3 + 6 = 9$.

3. Find $f(2)$. Since $2 \geq 2$, then $f(2) = 2 + 6 = 8$.

Name: _____

Question:	1	2	3	Total
Points:	5	5	5	15
Score:				