Name:_____

Summer Academy Math Diagnostic June 25, 2019

• This is a closed-book diagnostic quiz. No books, notes, calculators, cell phones, communication devices of any sort, webpages, or other aids are permitted.

• Please *show* all of your work and *justify* all of your answers.

1. For each of the following, first present a nice sketch **and** then second, state the Domain.

(a) $y = \sqrt{x}$

(b) $f(x) = \sqrt{x-3}$

2. Simplify $\dfrac{\dfrac{x}{x-1} - \dfrac{x+2}{x}}{x-2}$ as much as possible.

3. Consider $f(x) = x^2 + 4x + 3$. Compute each of the following. Simplify. Note: your answer may be a value, or in terms of a and/or h.

(a) $f(0) =$

(b) $f(-7) =$

(c) $f(a) =$

(d) $f(a + h) =$

(e) $\dfrac{f(a+h) - f(a)}{h} =$

(f) For what values of x does $f(x) = 0$?

4. Consider the function defined piece-wise by $f(x) = \begin{cases} -x^2 + 4 & \text{if } x \geq 0 \\ x - 3 & \text{if } -1 \leq x < 0 \\ -4 & \text{if } x < -1 \end{cases}$

(a) Graph $f(x)$ and state its Domain and Range.

(b) Compute $\lim_{x \to -1} f(x) =$

(c) Compute $\lim_{x \to 0} f(x) =$

5. Simplify each of the following values:

(a) $e^0 =$

(b) $\ln 1 =$

(c) $\sin 0 =$

(d) $\cos 0 =$

(e) $\sin\left(\frac{\pi}{3}\right) =$

(f) $\cos\left(\frac{\pi}{3}\right) =$

(g) $\tan\left(\frac{\pi}{6}\right) =$