Name: Solutions _____ / 6

You will have 15 minutes to complete the task. No aids (calculator, notes, text, etc.) are permitted. Show all work for full credit and box your final answer.

1. [2 points] For the given function $f(x) = \dfrac{2x}{x-3}$ find:

a. $\dfrac{f(z+3)-f(z)}{z} = \dfrac{\frac{2z+6}{z} - \frac{2z}{z-3}}{z} = \dfrac{(z-3)(2z+6)-2z^2}{z^2(z-3)} =$

$f(z+3) = \dfrac{2(z+3)}{z}$

$f(z) = \dfrac{2z}{z-3}$

$= \dfrac{2(z^2-9)-2z^2}{z^2(z-3)} = \boxed{\dfrac{-18}{z^2(z-3)}}$

b. $Dom(f) = \boxed{\mathbb{R} \setminus \{3\}}$

2. [2 points] For the given relation $R = \{(0,0),(1,2),(-4,1),(5,3)\}$ find the following:

a. $R^{-1} = \{(0,0),(2,1),(1,-4),(3,5)\}$

b. $Dom(R^{-1}) = \{0,2,1,3\}$

c. $Ran(R^{-1}) = \{0,1,-4,5\}$

3. [2 points] Sketch the graphs of the following functions:

(a) $f(x) = \dfrac{1}{x^4}$

(b) $g(x) = \dfrac{1}{(x-1)^3}$