Calculus I, Gradescope Assignment, Week 3

Q1. Write a formula for the functions $f \circ g$ and $g \circ f$ and find the domain and range of each, where $f(x) = \sqrt{x+2}$ and $g(x) = 1/x$. 6 marks

Q2. Given $u(x) = 2x-3,\ v(x) = x^4$ and $f(x) = 1/x,$ find $(u \circ (v \circ f))(x)$ and $(v \circ (u \circ f))(x)$ 2 marks

Q3. Find the inverse of the function $f(x) = x^3 + 1$ and identify the domain and range of this inverse function. 3 marks

Q4. Find the inverse of the function $f(x) = 1/x^2,\ \forall\ x > 0$, and identify the domain and range of this inverse function. 3 marks

Q5. Show that the function $f(x) = (1+3x)^3$ in $\mathbb{R}$ is injective and find its inverse. Specify the domain of the inverse. 3 marks

Q6. Show that the function $f(x) = (1-x)^2$ in $[-1, 2]$ is not injective. 1 mark

Q7. Complete the table 5 marks

$g(x)$	$f(x)$	$(f \circ g)(x)$
$x-7$	$\sqrt{x}$	
$x+2$	$3x$	
	$\sqrt{x-5}$	$\sqrt{x^2-5}$
$\frac{x}{x-1}$	$\frac{x}{x-1}$	
	$1+\frac{1}{x}$	x