Honors Analysis Name _____

Copy original problem. Per _____ Date _____

Convince *me* that **you** understand the concept***!***

Chapter 1 Exam

I State the domain for each of the following: (30 pts tot)

a) $A(x)=\sqrt{\dfrac{(2+x)(3-x)}{x^2-7x+12}}$

b) $B(x)=\sqrt{\dfrac{3}{5x+10}+\dfrac{2}{5x-15}}$

c) $C(x)=\dfrac{1}{1-\operatorname{sgn}(3x+7)}$

d) $D(x)=\sqrt{\dfrac{(x+3)^3\operatorname{sgn}(x+2)}{(x-1)^2}}$

II For each of the following, re-define as a "piece-wise" function. Sketch a graph. Specifically state the range of the function. (10 pts ea)

a) $A(x)=2^{\operatorname{sgn}\left((x+2)(x-3)\right)}$

b) $R(x)=\dfrac{(\operatorname{sgn}(x+1)+1)}{(\operatorname{sgn}(x-1)-1)}$

III Given coordinates: $P(1,5)$, $Q(4,1)$, $R(-8,-4)$, and $S(a,0)$. (that is, a is on the x-axis) (25 pts)

The figure, $PQRS$ is formed by ***connecting the points in order.*** Determine a so the figure formed is a parallelogram. Be convincing that you have a parallelogram (and not a trapazoid, for example). Explain.

IV Given $f(x)=\dfrac{2x+3}{5x-1}$ and $g(x)=\dfrac{2x+3}{7-x}$, and $h(x)=\sqrt{\dfrac{1}{f(x)}+\dfrac{1}{g(x)}}$. (25 pts tot)

a) Find $f^{-1}(x)$

b) Find $f\left(f^{-1}(x)\right)$

c) Find $f^{-1}(f(x))$

d) Find the formula for $h(x)$.

e) Find the domain for $h(x)$.

Extra Credit ---------- 5 pts ----------

Draw the graph of: $F(x)=\dfrac{|x-1|}{\operatorname{sgn}(x+1)}$