MATH-1150 PRACTICE EXAM #1 Instructor: Eric Harshbarger

Student Name: KEY

Show all relevant work (use back of pages for scratch paper, if needed). **CIRCLE FINAL ANSWERS.** Leave answers as fractions, not decimals. Each question is worth 5 points.

1. Let $f(x)=\frac{\sqrt{4-x}}{2x+3}$.

problems when: $x>4$, $x=-3/2$

(a) What is the domain of f?

$\{x \mid x \le 4,\ x \neq -3/2\}$ or $(-\infty, -3/2) \cup (-3/2, 4]$

(b) Evaluate $f(-5)$.

$f(-5)=\frac{\sqrt{4-(-5)}}{2(-5)+3}=\frac{\sqrt{9}}{-10+3}=\boxed{-\frac{3}{7}}$

2. Let $f(x)=$ $\begin{cases} 2-x & \text{if } x \le 0 \\ x^2+8 & \text{if } x > 0 \end{cases}$

(a) Evaluate $f(7)$.

$f(7)=7^2+8=49+8=\boxed{57}$

(b) Evaluate $f(-2)$.

$f(-2)=2-(-2)=2+2=\boxed{4}$

3. For the function $h(z)=9+z^3$ on the interval from $z=$ -1 (a) and $z=2$ (b),

(a) what is the net change?

$h(b)-h(a)=(9+2^3)-(9+(-1)^3)=(9+8)-(9-1)=17-8=\boxed{9}$

(b) what is the average rate of change?

$\frac{h(b)-h(a)}{b-a}=\frac{9}{2-(-1)}=\frac{9}{3}=\boxed{3}$

4. A function g is described in words as: "Add 1 to the number, then take the square root."

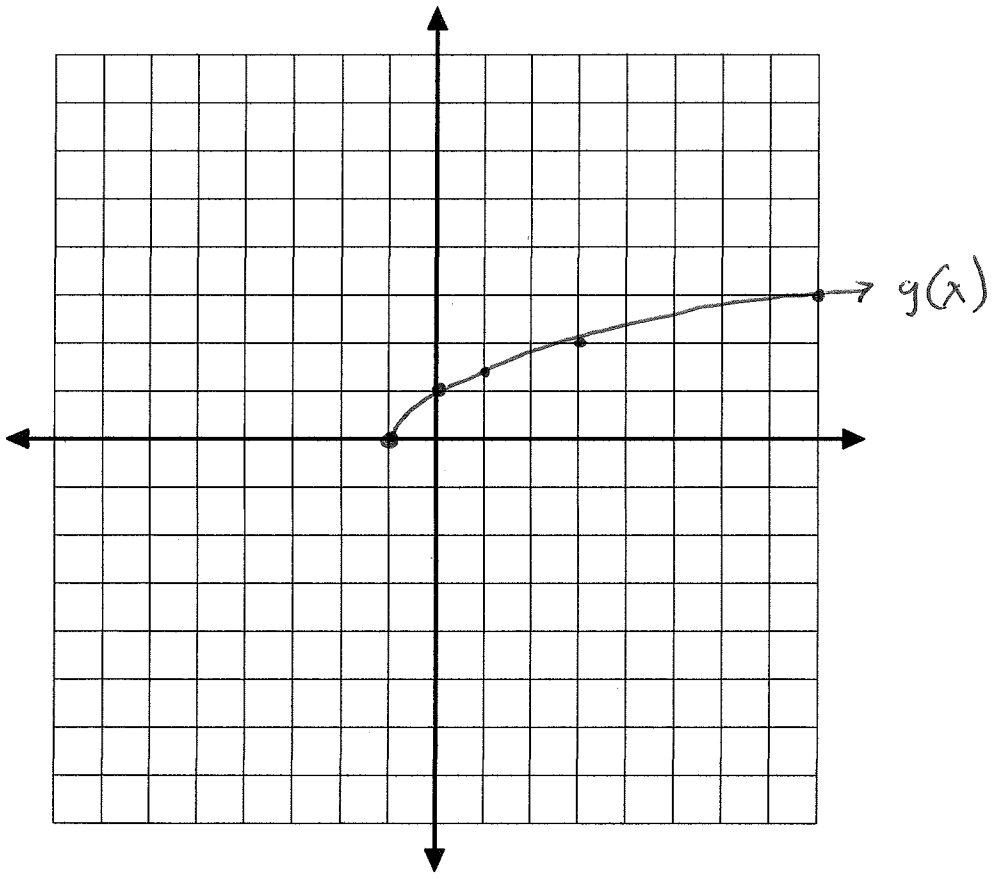
(a) Express function g algebraically.

$g(x) = \sqrt{x+1}$

(b) Complete the chart of values for g:

x	$g(x)$
-1	0
0	1
1	$\sqrt{2} \approx 1.4$
3	2
8	3

(c) Plot the points and sketch the graph of g using the table from (b) as a guide.



5. If $f(x) = x^2 - 5$ and $g(x) = 3x + 6$, find the following :

(a) $(f+g)(8)$ $= f(8) + g(8) = (8^2 - 5) + (3(8) + 6) = (64 - 5) + (24 + 6) =$

$59 + 30 =$ **89**

(b) $(g \circ f)(x)$

$g(f(x)) = g(x^2 - 5) = 3(x^2 - 5) + 6 = 3x^2 - 15 + 6 =$ **$3x^2 - 9$**

(c) $(g - f)(x) = g(x) - f(x) = (3x + 6) - (x^2 - 5) = 3x + 6 - x^2 + 5 =$

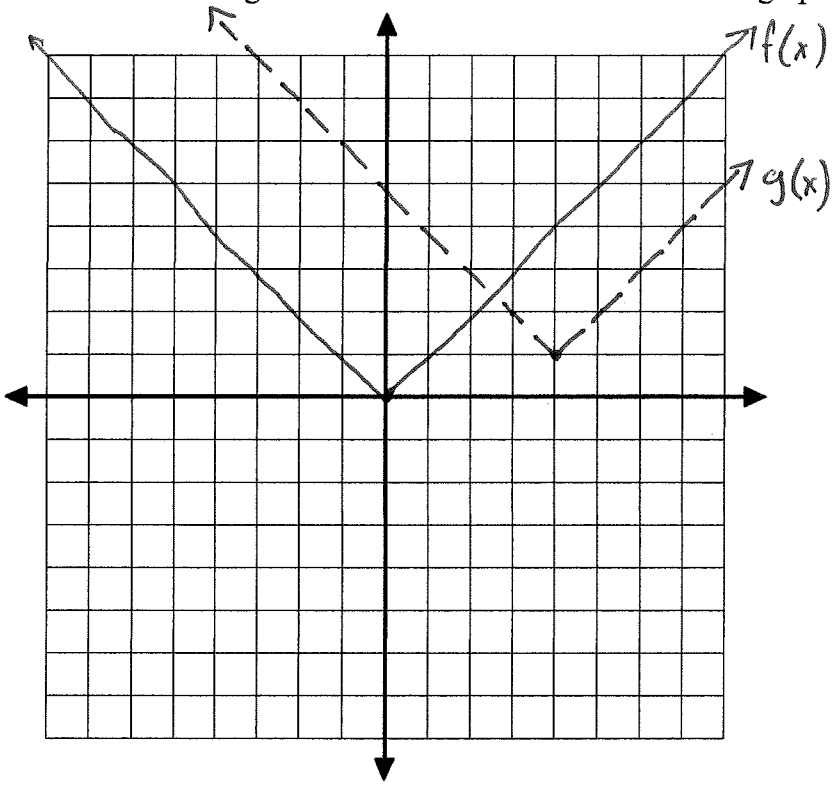
$-x^2 + 3x + 11$

(d) $(fg)(2) = f(2)\,g(2) = (2^2 - 5)(3(2) + 6) = (4 - 5)(6 + 6) = (-1)(12) =$ **-12**

(e) Is function f even, odd, or neither even nor odd?

$f(-x) = (-x)^2 - 5 = x^2 - 5 = f(x)$ **EVEN**

6. On the grid below sketch the graph of $f(x) = |x|$. Then, sketch the graph of $g(x) = |x - 4| + 1$. You may plot points by hand or use knowledge of transformations. Please label each graph drawn. [5pts, each graph]



g
1. right 4
2. up 1

7. In each part find f^{-1}.

(a) $f(x)=\frac{x}{5+3x}$

$y = \frac{x}{5+3x}$

~~$x = y(5+3x)$~~

~~$x = 5y$~~

$x = \frac{y}{5+3y}$

$y = x(5+3y)$

$y = 5x+3xy$

$y-3xy = 5x$

$y(1-3x) = 5x$

$y = \boxed{\frac{5x}{1-3x} = f^{-1}(x)}$

(b) $f(x)=\sqrt{5+x}$

$y = \sqrt{5+x}$

$x = \sqrt{5+y}$

$x^2 = 5+y$

$y = \boxed{x^2-5 = f^{-1}(x)}$

8. A pizza parlor sells pizza by the slice for \$3.00 + \$0.50 per topping. The price can therefore be expressed as $p(x) = 3 + 0.5x$ where x is the number of toppings you want.

(a) How much would a slice of pizza cost if you got mushrooms, pepperoni, and onions on it?

$p(3) = 3+0.5(3) = 3+1.5 = \boxed{\$4.50}$

(b) Find $p^{-1}(x)$.

$y = 3+0.5x$

$x = 3+0.5y$

$x-3 = 0.5y$

$y = \boxed{2(x-3) = p^{-1}(x)}$

(c) Evaluate $p^{-1}(5)$. What does this evaluation demonstrate?

$p^{-1}(5) = 2(5-3) = 2(2) = 4$

For \$5.00 you can get a slice of pizza with 4 toppings.