Review Unit 2.
Test is cumulative over unit 1 and unit 2.

1.	2.	3.	4.	5.	6.	7.
B	A	D	A	C	D	A

Calculator

Review

FREE RESPONSE – Calculator Permitted

Consider the functions, $f(x)$ and $g(x)$ shown below. The table represents values on the graph of a continuous function, $f(x)$.

Calculator

x	−6	−3	-1	1	3	6
$f(x)$	5	3	-1	1	3	5

$$g(x) = \frac{|x-6| - |x-1|}{x+1}$$

a. Frasier claims that $f(x)$ is an even function. Cason claims that Frasier is incorrect and then explains why. Pretend that you are Cason and offer Frasier an explanation. Give a specific example in your explanation.

+1

If $f(x)$ is EVEN, then for every point (x,y) there exists $(-x,y)$

$f(-1)=-1$ which should mean $f(1)=-1$, but actually $f(1)=1$

+1

$\therefore f(x)$ is not EVEN

b. If $p(x) = \sqrt{x+4} - 1$, for what value of x does $p(x) = f(g(2))$? Show all of your work.

1

$$g(2) = \frac{|2-6| - |2-1|}{2+1}$$

$$= \frac{|-4| - |1|}{3}$$

$$= \frac{4-1}{3}$$

$$= \frac{3}{3}$$

$$g(2) = 1$$

+1

2

$$\sqrt{x+4} - 1 = f(g(2))$$

$$\sqrt{x+4} - 1 = f(1)$$

Table

$$\sqrt{x+4} - 1 = 1$$

$$\sqrt{x+4} = 2$$

$$x+4 = 4$$

$$x = 0$$

+1

Review

c. Does the inverse, $f^{-1}(x)$ exist? Completely explain your reasoning.

Calculator

x	−6	−3	-1	1	3	6
$f(x)$	5	3	-1	1	3	5

Dec Inc

Not part of work to get points

f(x) decreases and then increases. +1

∴ f(x) is not 1-1

∴ $f^{-1}(x)$ does not exist. +1

d. Rewrite $g(x)$ as a piece-wise defined function, without absolute value bars. Show the analysis that leads to your answer.

$$g(x) = \frac{|x-6| - |x-1|}{x+1}$$

$x-6=0$, $x=6$; $x-1=0$, $x=1$; $x+1 \neq 0$, $x \neq -1$

Number line: -1, 1, 6; test values $x=-2$, $x=0$, $x=2$, $x=10$

$x<-1$: $y=\frac{-(x-6)-(-(x-1))}{x+1}$, $y=\frac{-x+6+x-1}{x+1}$, $y=\frac{5}{x+1}$

$-1<x<1$: Same. $y=\frac{-(x-6)-(-(x-1))}{x+1}$, $y=\frac{5}{x+1}$

$1 \le x \le 6$: $y=\frac{-(x-6)-(+(x-1))}{x+1}$, $y=\frac{-x+6-x+1}{x+1}$, $y=\frac{-2x+7}{x+1}$

$x>6$: $y=\frac{+(x-6)-(+(x-1))}{x+1}$, $y=\frac{x-6-x+1}{x+1}$, $y=\frac{-5}{x+1}$

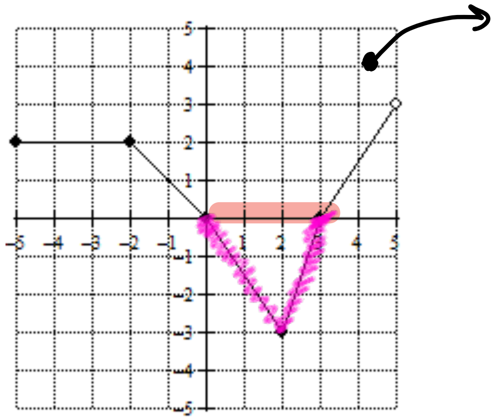
$$g(x)=\begin{cases}\frac{5}{x+1}, & x<1,\ x\neq -1 \quad +1\\ \frac{-2x+7}{x+1}, & 1\le x\le 6 \quad +1\\ \frac{-5}{x+1}, & x>6 \quad +1\end{cases}$$

Review

B A, D

The graph of a function, *h*(*x*), is pictured. Use the graph to answer questions 1 – 2.

Calculator



[0, 3]

1. Which of the following intervals identifies all values of *x* for which $h(x) \leq 0$?

Below or on x-axis

A. $(0, 3)$ B. $[0, 3]$ C. $[-5, 0] \cup [3, 5)$

D. $(-5, 0) \cup (3, 5)$ E. $[-5, 0) \cup (3, 5)$

2. If $f(x) = \sqrt{x-4} + 4$, for how many values of *x* is *f*(*x*) = *h*(*x*)?

A. None B. One C. Two

D. Three E. Cannot be determined

3. Which of the statements is/are true about the graph of the piecewise defined function, *g*(*x*).

I. The domain of *g*(*x*) is $(-9,\ 3) \cup (3,\ \infty)$. T

II. The graph of *g*(*x*) is a continuous at *x* = –2. F

III. The graph of *g*(*x*) has a point discontinuity at *x* = 3. T

$$g(x) = \begin{cases} -|x+3| - 4, & -9 < x < -2 \\ 2x+1, & -2 \leq x < 3 \\ \sqrt{x-3} + 7, & x > 3 \end{cases}$$

@x=2

$-|x+3|-4 \stackrel{?}{=} 2x+1$

$-|-2+3|-4 \neq 2(-2)+1$

$-|1|-4 \neq -4+1$

$-1-4 \neq -3$

$-5 \neq -3$

A. I only B. I and II only C. II and III only

D. I and III only E. I, II and III

$2(3)+1 = 7$

$\sqrt{3-3} + 7 = 7$

Review

4. A function $F(x)$ is such that $F(-x) = -F(x)$. If $F(2) = -5$, which of the following points must also be on the graph of $F(x)$?

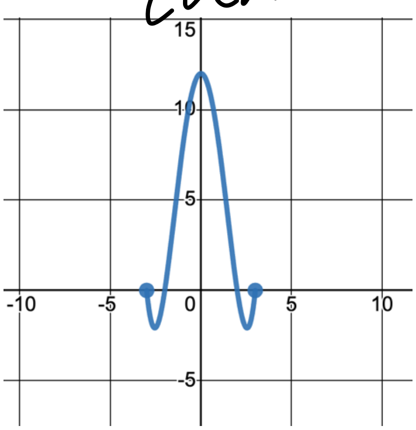
(-2,5)

A. (−2, 5)
B. (2, 5)
C. (−2, −5)
D. (−5, 2)
E. (−5, −2)

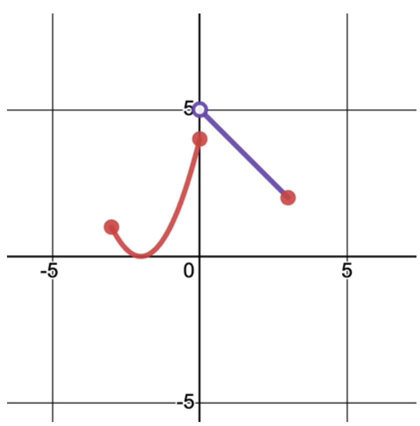
Calculator

5. Which of the following functions is an even function?

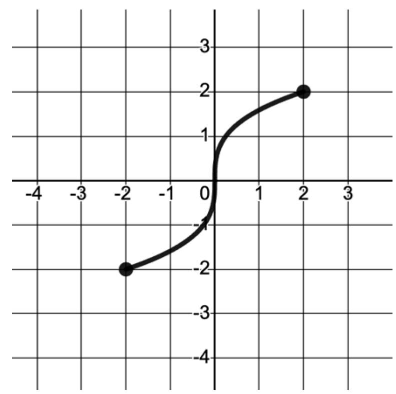
I. Even



II. Neither



III. ODD

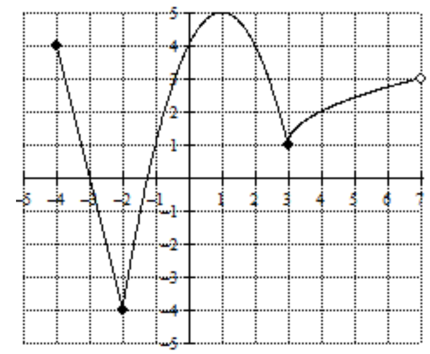


A. I and III only
B. II only
C. I only
D. I and II only
E. III only

Review

D, A Calculator

6. Use the graph of $g(x)$ pictured to determine which of the following statements is/are true.



I. $g(x)$ is increasing on the interval $(-2,1)\cup(3,7)$. T

II. $g(x)$ is an example of a one – to – one function. F

III. $g(x) = -(x-1)^2 + 5$ on the interval $-2 \le x \le 3$. T

vertex(1,5)
opens down

A. I only
B. I and II only
C. II only
D. I and III only
E. I, II, and III

7. If $g(x) = \frac{\sqrt{3x+16}}{x+4}$ and $f(x)$ is the function pictured, then what is the value of $f(g(0))$?

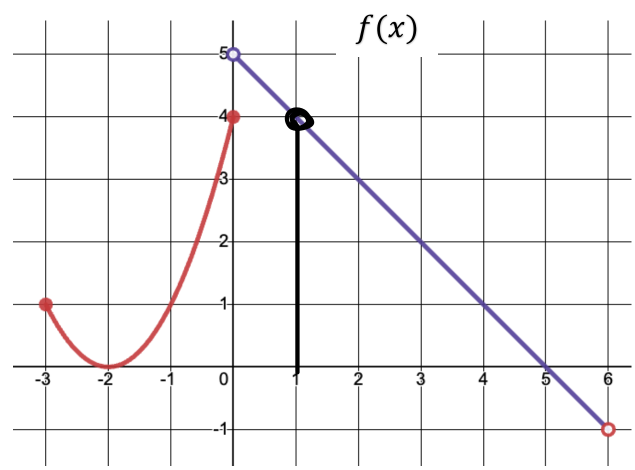
A. 4

B. 3

C. 2

D. 1

E. Undefined



$g(0) = \frac{\sqrt{3\cdot 0+16}}{0+4}$

$= \frac{\sqrt{16}}{4}$

$= \frac{4}{4}$

$g(0) = 1$

$f(1) = 4$

Review