

Multiple Choice	$\times (9/7)$	
Free Response	$\times 1$	
Total Score out of 18		

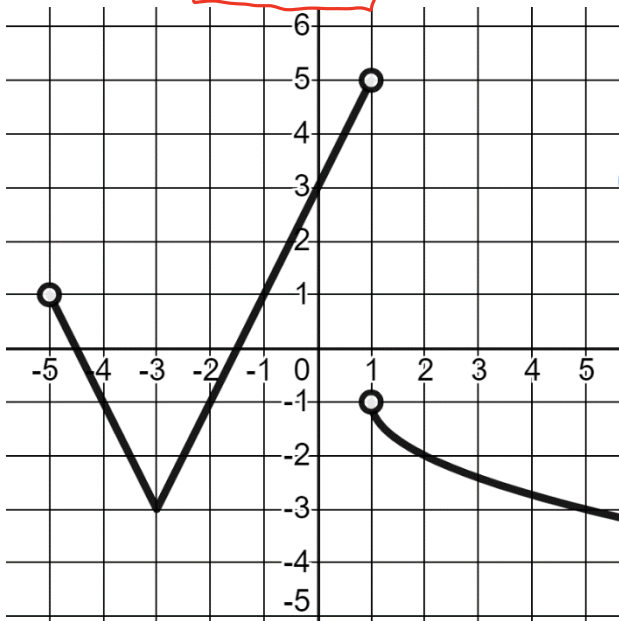
Multiple Choice

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

FREE RESPONSE – NO Calculator

Consider the graph of the piece-wise defined function, $h(x)$, pictured.

- a. If $h(x) \leq 0$, then explain in words what must be true graphically. Then, state the value(s) of x for which $h(x) \leq 0$.



+1

• $h(x) \leq 0$ on $[-4.5, -1.5] \cup (1, \infty)$

+1

• If $h(x) \leq 0$ then the graph of $h(x)$ is on or below the x -axis.

- b. Find the value(s) of x for which $h(x) = -2$. Using the graph, explain your reasoning.

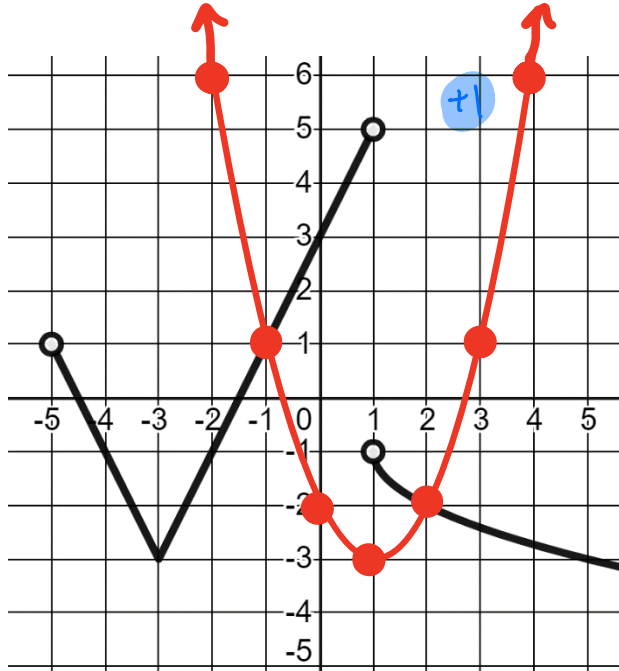
+1

• $h(x) = -2$ when $x = -3.5$, $x = -2.5$, and $x = 2$

+1

• when $h(x) = -2$, the graph of $h(x)$ has a y -value of -2 .

- c. On the grid below, graph the function $f(x) = (x - 1)^2 - 3$. Then, state the values of x for which $f(x) = h(x)$. Explain how you determined the values of x . If a value of x has been approximated, please denote that using proper notation.



- +1
- If $f(x) = h(x)$ then the graphs of $f(x)$ and $h(x)$ intersect.
- +1
- $f(x) = h(x)$ at $x = -1$ and $x = 2$

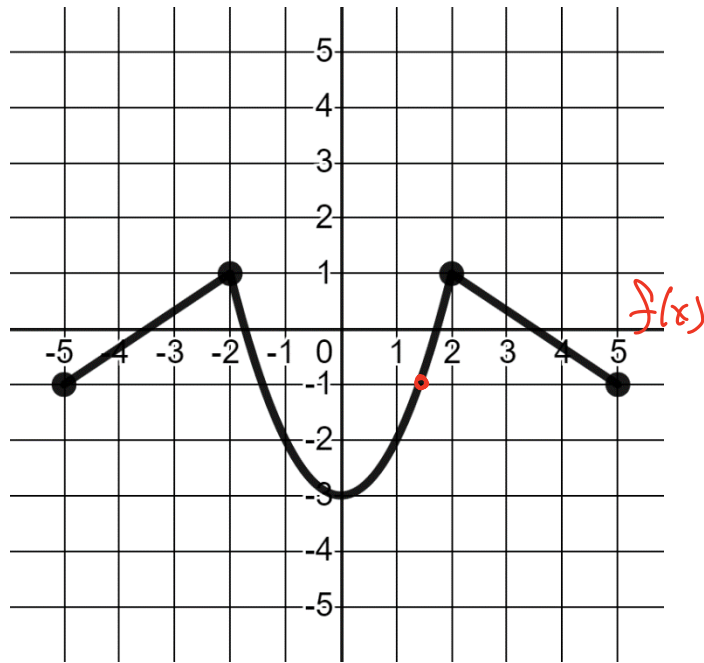
- d. If $p(x) = 3ax^2 - 2x$, then for what value(s) of a does $p(-2) = [2h(-4) + h(0)]$. Show your work.

$$\begin{aligned}
 p(-2) &= 2h(-4) + h(0) \\
 3a(-2)^2 - 2(-2) &= 2(-1) + 3 \\
 3a(4) + 4 &= -2 + 3 \\
 12a + 4 &= 1 \\
 12a &= -3 \quad +1 \\
 a &= -\frac{3}{12} \\
 a &= -\frac{1}{4} \quad +1
 \end{aligned}$$

MULTIPLE CHOICE – NO Calculator

1. Suppose that $g(x) = -(x - 1)^2 + 2$. Which of the following statements is true if $f(x)$ is the function pictured?

$$\begin{aligned}
 g(2) &= -(2-1)^2 + 2 \\
 &= -(1)^2 + 2 \\
 &= -1 + 2 \\
 &= 1 \\
 g(2) &> 0
 \end{aligned}$$



$$f(1.5) < 0$$

- A. $g(2) < f(1.5)$
- B. $g(2) > f(1.5)$
- C. $g(2) = f(1.5)$
- D. No comparison can be made because $f(1.5)$ cannot be determined.
- E. No comparison can be made because $g(2)$ cannot be determined.

2. The graph of a function $h(x)$ is pictured. If $p(x) = 3|x + 2| - 4$, then for what value(s) of x is the function $p(x) = h(4)$?

- A. $x = -1$ only
- B. $x = -3$ and -1
- C. $x = -3$ and -1
- D. $x = -5$ and 1
- E. $x = -1$ and 5

$$-1 = 3|x+2| - 4$$

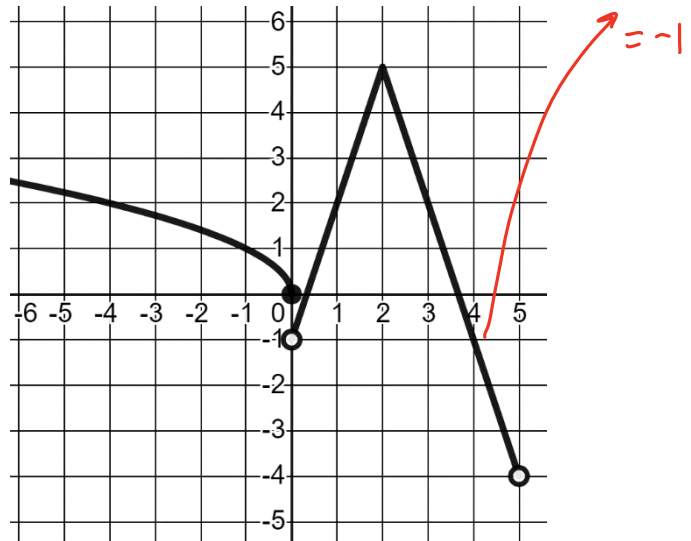
$$3 = 3|x+2|$$

$$1 = |x+2|$$

$$\pm 1 = x + 2$$

$$-2 \pm 1 = x$$

$$-3, -1$$



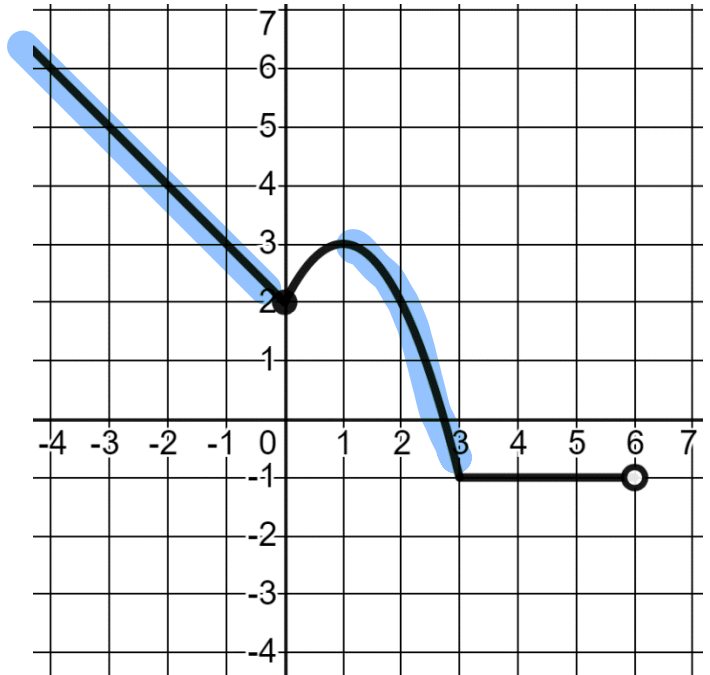
3. The graph of a function $f(x)$ is pictured. Which of the following statements is/are true about the graph of $f(x)$?

I. The graph of $f(x)$ is decreasing on the interval $(-\infty, 0) \cup (1, 3)$. ✓

II. The value of $f(x) = -1$ for all values of x on the interval $[3, 6]$. ✗ $[3, \infty)$

III. The domain of $f(x)$ is $(-\infty, 6)$. ✓

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



4. The graph of $f(x)$ is shown. Which of the following intervals correctly identifies all values of x for which $f(x) > 0$? ✓

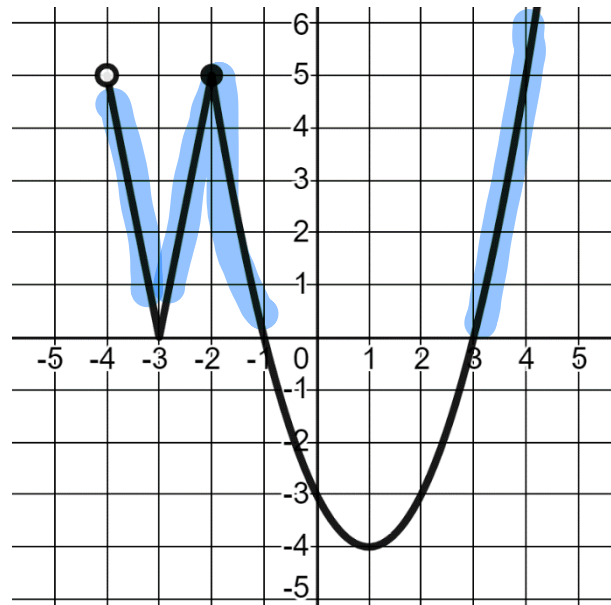
A. $(-4, 1) \cup (3, \infty)$

B. $[-4, 1] \cup (3, \infty)$ ✗

C. $(-4, 1) \cup [3, \infty)$

D. $[-4, -3) \cup (-3, -1) \cup (3, \infty)$ ✗

E. $(-4, -3) \cup (-3, -1) \cup (3, \infty)$ ✓



5. Use the table of values to the right to determine the value of $[f(-1) + 2g(3)]$.

- A. 14
- B. 10
- C. 8**
- D. 5
- E. -2

$$= 2 + 2(3)$$

$$= 2 + 6$$

$$= 8$$

x	f(x)	g(x)
-2	-2	3
-1	2	3
2	0	4
3	-1	3

6. If $g(x) = \sqrt{x-4} + 6$, for what value(s) of x is $g(x) = -2$?

- A. $x = 3$
- B. $x = 0$
- C. $x = 8$
- D. $x = 20$
- E. No value of x will make $g(x) = -2$.**

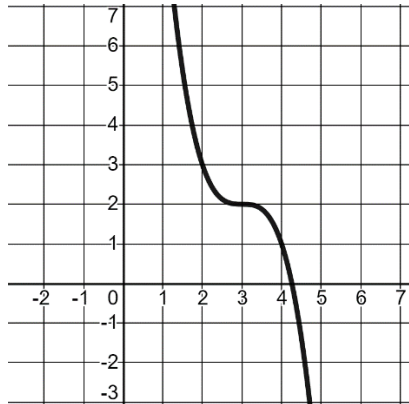
$$-2 = \sqrt{x-4} + 6$$

$$-8 = \sqrt{x-4}$$

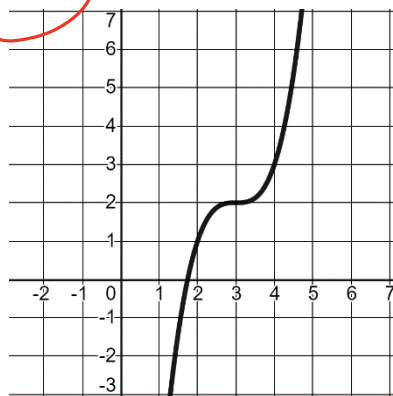
This is impossible $\sqrt{\quad} = \text{positive number}$.

7. Which of the following graphs is the graph of the function $g(x) = (x - 3)^3 + 2$?

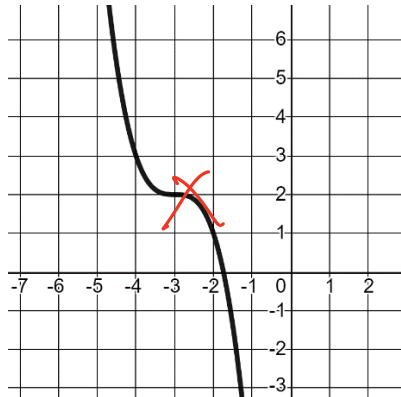
A.



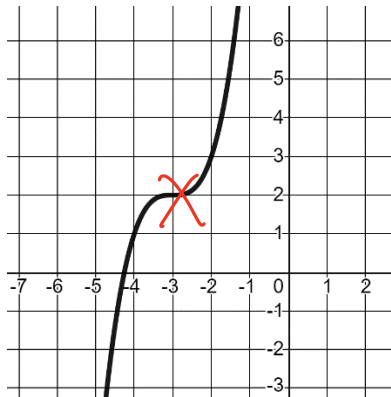
B.



C.



D.



E. None of these graphs