$2.2 - 2.3$: Graphs of Functions

1. The graph of the equation $xy = |x^3 - y|$ is

   A) symmetric with respect to the x-axis only.

   B) symmetric with respect to the x-axis and y-axis.

   C) symmetric with respect to the origin only.

2. The range of the function $f(x) = \begin{cases} x^2 - 1 & \text{if } x \geq 0 \\ \frac{|x|}{x} & \text{if } x < 0 \end{cases}$, is

   A) $[-1, \infty)$

   B) $(-\infty, 1]$

   C) $(-\infty, \infty)$

   D) $(0, \infty)$

   E) $(-1, \infty)$

3. Which one of the following represent y as a function of x ?

A) $2|x| + y = 0$

B) $2x + |y| = 0$

C) $\sqrt{y^2} - x^4 = 0$

D) $x = 1$

E) $x^2 + (y-1)^2 = 4$

4. If $[a, b]$ is the largest interval on which the function

$$f(x) = \begin{cases} 4 & ; \quad x \leq -1 \\ x^2 & ; \quad -1 < x < 1 \\ -x + 5 & ; \quad x \geq 1 \end{cases}$$ is increasing, then $a + b =$

A) 1

B) -1

C) 0

D) 2

E) 4

5. The graph of the function $f(x) = [\,[\frac{x}{2} - 3]\,]$, lies above the x-axis over the interval

A) $[8, \infty)$

B) $(-6,6)$

C) $(-3, \infty)$

D) $(0, \infty)$

E) $(6, \infty)$

6. The range of $f(x) = \begin{cases} |x| + 1 & ; \quad x < 1 \\ -x^2 - 1 & ; \quad 1 \leq x < 2 \\ 3 & ; \quad x \geq 2 \end{cases}$, is:

A) $(-5, -2] \cup [1, \infty)$

B) $(-\infty, -2] \cup [1, \infty)$

C) $(-\infty, -1] \cup [1, \infty)$

D) $(-5, -1] \cup (3, \infty)$

E) $(-5, -2] \cup [1,2) \cup (2, \infty)$

7. If D is the domain of $f(x) = \sqrt{16 - x^2}$ and R is the range of $g(x) = [\,[x + 1]\,]$ where $[\,[x]\,]$ denotes the greatest integer function of x, then $D \cap R =$

A) $\{-4, -3, -2, -1, 0, 1, 2, 3, 4\}$

B) $(-4, 4)$

C) $[-4, 4]$

D) $(-\infty, \infty)$

E) $(-\infty, -4] \cup [4, \infty)$

8. If $f(x) = \frac{2}{3}x + 2$, then $f(x - 3) =$

A) $f(x) - 2$

B) $f(x) + 2$

C) $f(x) - 3$

D) $f(x) + 3$

E) $f(x) + 2/3$

9. In the graph of $f(x) = \begin{cases} |x| - 1 & \text{if } x > -1 \\ x - 1 & \text{if } x \leq -1 \end{cases}$ we have

A) one x-intercept and one y-intercept

B) one x-intercept and two y-intercepts

C) two x-intercepts and one y-intercept

D) two x-intercepts and two y-intercepts

E) two x-intercepts only

10. Let $f(x) = [x]$ be the greatest integer function. Then only one of the following statements is TRUE ?

A) $y = [x]$ is not a function by the vertical line test

B) $[\pi - 1] = 3$

C) $[x] = -3$ if $-4 \leq x < -3$

D) the range of $y = [x - 1]$ is the set of all integers

E) the domain of $y = [x - 1]$ is the set of all integers

11.If $f(x) = [1 - 2x]$, where [] is the greatest integer function, then $f(x) = 1$ when

A) $0 \leq x < \frac{1}{2}$

B) $-\frac{1}{2} < x \leq 0$

C) $-\frac{1}{2} \leq x < 0$

D) $-1 < x \leq 1$

E) $\frac{1}{2} < x \leq 1$

12.If $f(x) = \begin{cases} 2x & x \leq -2 \\ x^2 & -2 < x < 1 \\ 4 - x & x \geq 1 \end{cases}$, then $f(x)$ has

A) two x-intercepts and onc y-intercept.

B) one x - intercept and one y - intercept

C) one x-intercept and two y - intercepts.

D) two x - intercepts and two y-intercepts.

E) one x - intercept only.

13. If $f(x) = [3x - 1]$ where [ ] is the greatest intger function, then $f(x) = 0$ when

A) $\frac{1}{3} \leq x < \frac{2}{3}$

B) $\frac{1}{3} < x \leq 1$

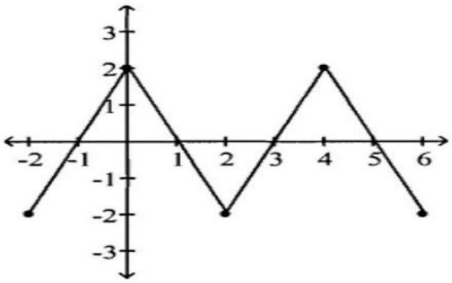
C) $-3 < x \leq \frac{1}{3}$

D) $\frac{2}{3} \leq x < 1$

E) $-3 \leq x < 1$

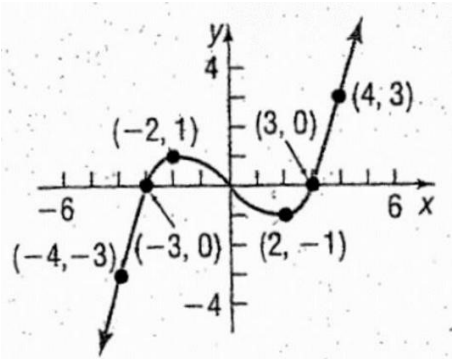
14. From the adjacent graph, the intervals over which the function is increasing:

A) $[-2,0]$ and $[2,4]$



15. From the adjacent graph, the function is decreasing on the interval:

A) $[-2,2]$



16. The graph of $f(x) = \begin{cases} 2 & \text{if} \quad x < 0 \\ (x-1)^2 & \text{if} \quad x \geq 0 \end{cases}$ is increasing on the interval

A) $(1, \infty)$

B) $(0, \infty)$

C) $(-\infty, 1)$

D) $(-\infty, 0)$

E) $(0,1)$

17.If $f(x) = \begin{cases} [\,[2x+6]\,], & \text{if } x \le -1 \\ |3x-4|, & \text{if } -1 \le x \le 2, \\ 3, & \text{if } x > 2 \end{cases}$

then $f(-\pi) + f(1) + f(4) =$

A) -3

B) $-2\pi + 9$

C) $-2\pi + 10$

D) 3

E) 4

18.Let $f(x) = \begin{cases} -x+1, & \text{if } x \le 0 \\ |x-1|, & \text{if } 0 < x \le 2. \\ 1, & \text{if } x > 2 \end{cases}$ Then the graph of f is

increasing on the interval

A) $(2, \infty)$

B) $(1,2)$

19.The range of the function $f(x) = 3 - |x - 1|$ is given by

A) $(-\infty, 3]$

20.The graph of the function $f(x) = \begin{cases} |x|, & \text{if } x \leq 1; \\ 5, & \text{if } x > 1, \end{cases}$ is increasing on the interval

A) $(0,1)$

B) $(1, \infty)$

C) $(-\infty, 0)$

D) $(-\infty, \infty)$

E) $(0, \infty)$

21. The range of the function $f(x) = \begin{cases} x^2 + 1, & \text{if } x \geq 0; \\ x - 1, & \text{if } x < 0, \end{cases}$ is

A) $(-\infty, -1) \cup [1, \infty)$

B) $(-\infty, 1]$

C) $(-\infty, \infty)$

D) $(1, \infty)$

E) $(-1, \infty)$