2.2-2.3

Graphs of Functions

1) Which one of the following equations **DOES NOT** represent y as a function of x ?

A) $x^2 - |y| = 4$

B) $x^2 - 2y = 8$

C) $2x - y = -6$

D) $|x| - 3y = 4$

E) $x^4 - y^3 = 3$

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

A) $[-1, \infty)$

B) $(-\infty, 1]$

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

D) $(0, \infty)$

E) $(-1, \infty)$

3) If $f(x) = \begin{cases} -\left|-x\right| & \text{if} \quad x < 0 \\ -2 & \text{if} \quad 0 \leq x < 4 \\ [\![x - 4]\!] & \text{if} \quad x \geq 4 \end{cases}$, where $[\![\ ]\!]$ is the greatest integer function, then $f(-2) + f(0) + f(2\pi) =$

A) -2

B) -6

C) 2

D) -1

E) 6

4) Which one of the following statements is **TRUE** about the function graphed below?

A) f is decreasing on the interval $(-2, 4)$

B) f is increasing on the interval $(-2, 4)$

C) $f(-2) = 5$

D) The domain of f is $(-2, 4) \cup (4, \infty)$

E) The range of f is the interval $(-6, 5)$

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

6) If $f(x) = \begin{cases} \sqrt{(1 - 5x)^2}, & \text{if } x < 2 \\ [\![2x + 1]\!] , & \text{if } x \geq 2 \end{cases}$, then $f(\pi) + f(1) =$

A) 11

B) 7

C) - 4

D) $5\pi + 2$

E) $2\pi + 5$

7) If $f(x) = \begin{cases} -x^2 + 6 & \text{if} \quad x < -3 \\ |2 + 5x| & \text{if} \quad -3 \le x < 1 \\ [\![3x - 4]\!] & \text{if} \quad x \ge 1 \end{cases}$, where $[\![\ ]\!]$ denotes the greatest integer function, then $f(\pi) - f(-2) =$

A) -3

B) 13

C) 0

D) 7

E) -7

8) The function $f(x) = \begin{cases} \dfrac{|x|}{x} & \text{if} \quad x < 0 \\ 4 - x^2 & \text{if} \quad x \ge 0 \end{cases}$ and $k < 0$, then $f(k) - (1/5)\, f(3) =$

(a) 0

(b) -2

(c) -6

(d) 2

(e) 6

9) If $f(x) = \begin{cases} [\![3 - 2x]\!] & \text{if} \quad 0 \le x < 3 \\ |4x - 1| & \text{if} \quad -3 \le x < 0, \\ -2 & \text{if} \quad x < -3 \end{cases}$ then

$f(11/4) + f(-2) + f(-5) =$

(a) 4

(b) -1

(c) -20

(d) -15

(e) 5

10) The set of all values of x for which $\left[\!\left[\frac{1}{2}x+1\right]\!\right]=-3$, where $[\![\cdot]\!]$ denotes the greatest integer function, is in the interval

(a) $[-8,-6)$

(b) $[-4,-3)$

(c) $[-7,-5)$

(d) $[-3,0)$

(e) $[6,\ 8)$

11) If $[a,b]$ is the largest interval on which the function $f(x)=\begin{cases} 4 & ; \quad x\le -1 \\ x^2 & ; \quad -1<x<1 \\ -x+5 & ; \quad x\ge 1 \end{cases}$ is increasing, then $a+b=$

(a) 1

(b) -1

(c) 0

(d) 2

(e) 4

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

(a) $[8,\ \infty)$

(b) $(-6,6)$

(c) $(-3,\infty)$

(d) $(0,\infty)$

(e) $(6,\infty)$

13) The range of the function $f(x)=\begin{cases} |x|+1 & \text{if } x<1 \\ -x^2-1 & \text{if } 1\le x<2 \\ 3 & \text{if } x\ge 2 \end{cases}$, 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) $(-5,-2]\cup[1,2)\cup(2,\infty)$

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

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

16) In the graph of $f(x)=\begin{cases} |x|-1 & if\ x>-1 \\ x-1 & if\ x\le -1 \end{cases}$

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

17) If $f(x) = \begin{cases} 4x^2 & if \quad x \leq 0 \\ 2x+1 & if \quad 0 < x < 2 \\ |x-2| & if \quad x \geq 2 \end{cases}$

then $f(-1) + f(1) + f(5)$

(a) 10

18) Given $f(x) = \begin{cases} 2x+1 & if \quad x < 2 \\ [2x+1] & if \quad x \geq 2 \end{cases}$, where [] is the greatest integer function, then $f(-4) + f\left(\frac{7}{3}\right)$ is equal to

(a) -2
(b) $\frac{29}{3}$
(c) -3
(d) -9
(e) $-\frac{4}{3}$

19) Given $f(x) = \begin{cases} \sqrt{(1-5x)^2} & if \quad x < 2 \\ [2x+1] & if \quad x \geq 2 \end{cases}$, where [] is the greatest integer function, then $f(\pi) + f(1)$ is equal to

(a) 11
(b) $5\pi + 2$
(c) -4
(d) 7
(e) $2\pi + 5$

20) 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

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

22) 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 one 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.

23) 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) $-1 < x \leq \frac{1}{3}$

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

E) $-3 \leq x < 1$

24) For the function $f(x) = \begin{cases} [\![x - 1]\!] & \text{if } x > 0 \\ |2x - 5| & \text{if } x \le 0 \end{cases}$,

where $[\![\ ]\!]$ is the greatest integer function, then $f(\pi) - f(-1/2) =$

A) -4

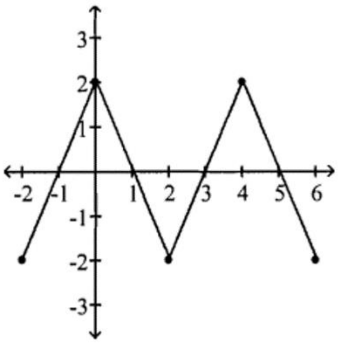
B) 3

C) -2

D) 4

E) -3

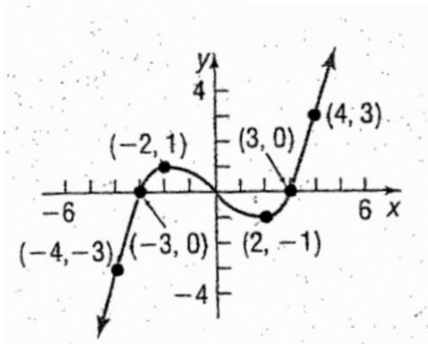
25) From the adjacent graph , the intervals over which the function is increasing:



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

26) From the adjacent graph , the function is decreasing on the interval

A) $[-2,2]$



27) 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) $(0, 1)$