Typewise PYQ (2006-2024)

Function

July 9, 2024

Type 1: Is This Relation Function Or Not?

1. Consider the following statements: [NDA 2 23]

   (a) The relation f defined by
   $$f(x) = \begin{cases} x^3, & 0 \le x \le 2 \\ 4x, & 2 \le x \le 8 \end{cases}$$ is a function.

   (b) The relation g defined by
   $$g(x) = \begin{cases} x^2, & 0 \le x \le 4 \\ 3x & 4 \le x \le 8 \end{cases}$$ is a function.

   Which of the statements given above is/are correct?

   (a) 1 only

   (b) 2 only

   (c) both 1 and 2

   (d) neither 1 nor 2

2. Consider the following relations from A to B where $A = \{u, v, w, x, y, z\}$ and $B = \{p, q, r, s\}$ [NDA 1 14]

   (1) {(u,p), (v,p), (w,p), (x,q), (y,q), (z,q)}
   (2) {(u,p), (v,q), (w,r), (z,s)}
   (3) {(u,w), (v,r), (w,q), (u,p), (v,q), (z,q)}
   (4) {(u,q), (v,p), (w,s), (x,r), (y,q), (z,s)}

   which of the above relations are not functions?

   (a) 1 and 2

   (b) 2 and 3

   (c) 3 and 4

   (d) 1 and 4

3. Consider the following statements: [NDA 2 22]

1.If f is the subset of $X \times Z$, defined by f=$\{(xy, x–y) : x, y \in Z\}$, then f is a function from Z to Z.

2.If f is the subset of $N \times N$, defined by f=$\{(xy, x+y) : x, y \in N\}$, then f is a function from N to N.

Which of the statements given above is/are correct?

(a) 1 only
(b) 2 only
(c) both 1 and 2
(d) neither 1 nor 2

4. $f : \{1,2,3\} \to \{4,5\}$ is not a function if it is defined by which one of the following? [NDA 2 08]

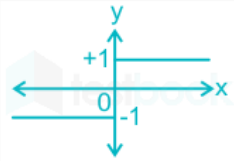
(a) {(2,4), (3,5), (1,5)}
(b) {(1,4), (2,4), (3,4)}
(c) {(1,4), (2,5), (3,4)}
(d) {(1,4), (1,5), (2,4), (2,5), (3,4), (3,5)}

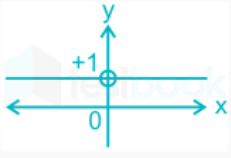
Type 2: Domain, Range Of Fxns

Polynomial Fxn

5. Which of the following graphs represents the function $f(x) = \frac{x}{x}, x \neq 0$ [NDA 2 17]

1. 

2. 

3. 

4. None of the above

6. If x is any real number, then $\frac{x^2}{1+x^4}$ belongs to which one of the following intervals? [NDA 2 17]

   (a) $(0, 1)$

   (b) $(0, \frac{1}{2}]$

   (c) $[0, \frac{1}{2}]$

   (d) $[0, 1]$

7. What is the range of the function $y = \frac{x^2}{1+x^2}$ where $x \in \mathbb{R}$? [NDA 1 16]

   (a) $[0, 1)$

   (b) $[0, 1]$

   (c) $(0, 1]$

   (d) $(0, 1)$

8. Suppose $f : R \to R$ is defined by $f(x) = \frac{x^2}{1+x^2}$ What is the range of the function? [NDA 1 18]

   (a) $[0, 1)$

   (b) $[0, 1]$

   (c) $(0, 1]$

   (d) $(0, 1)$

9. Which one of the following is correct in respect of the graph of $y = \frac{1}{1-x}$? [NDA 2020]

   (a) The domain is $\{x \in \mathbb{R} : x \neq 1\}$ and the range is the set of reals.

   (b) The domain is $\{x \in \mathbb{R} : x \neq 1\}$, the range is $\{y \in \mathbb{R} : y \neq 0\}$, and the graph intersects y-axis at (0,-1).

   (c) The domain is the set of reals and the range is singleton set $\{0\}$.

   (d) The domain is $\{x \in \mathbb{R} : x \neq 1\}$, the range is the set of points on the y axis.

10. A function $f : A \to \mathbb{R}$ is defined by the equation $f(x) = x^2 - 4x + 5$ where $A = (1, 4)$.What is the range of the function? [NDA 2 18]

    (a) (2, 5)

    (b) (1, 5)

    (c) [1, 5)

    (d) [1, 5]

Square Root Fxn

11. What is the domain of the function $f(x) = \sqrt{2-x} + \sqrt{2+x}$? [NDA 2 23]

(a) $(-2, 2)$

(b) $[-2, 2]$

(c) $R-(-2, 2)$

(d) $R-[-2, 2]$

12. What is the domain of the function $f(x) = \sqrt{1-(x-1)^2}$? [NDA 1 22]

(a) $(0, 1)$

(b) $[-1, 1]$

(c) $(0, 2)$

(d) $[0, 2]$

13. if $f(x) = \frac{\sqrt{x-1}}{x-4}$ defines a function of R, then what is domain? [NDA 2 18]

(a) $(-\infty, 4) \bigcup (4, \infty)$

(b) $(4, \infty)$

(c) $(1, 4) \bigcup (4, \infty)$

(d) $[1, 4) \bigcup (4, \infty)$

14. The domain of the function $f(x) = \sqrt{(2-x)(x-3)}$ [NDA 1 19]

(a) $(0, \infty)$

(b) $[0, \infty)$

(c) $[2, 3]$

(d) $(2, 3)$

Square Root & Modulus Fxn

15. Which one of the following is correct in respect of $f(x) = \frac{1}{\sqrt{|x|-x}}$ and $g(x) = \frac{1}{\sqrt{x-|x|}}$? [NDA 1 24]

(a) f(x) has some Domain and g(x) has no domain

(b) $f(x)$ has no domain and $g(x)$ has some domain

(c) $f(x)$ and $g(x)$ have the same domain

(d) $f(x)$ and $g(x)$ do not have any domain

16. For f to be a function, what is the domain of f, if $f(x) = \frac{1}{\sqrt{|x|-x}}$? [NDA 1 18]

(a) $(-\infty, 1)$

(b) $(0, \infty)$

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

(d) $(-\infty, 0]$

17. The domain of the function $f(x) = \frac{1}{\sqrt{|x|-x}}$ is [NDA 2 15]

(a) $[0, \infty)$

(b) $(-\infty, 0)$

(c) $[1, \infty)$

(d) $(-\infty, 0]$

18. What is the domain of the function $f(x) = \frac{1}{\sqrt{|x|-x}}$? [NDA 2 16]

(a) $(\infty, 0)$

(b) $(0, \infty)$

(c) $0 < x < 1$

(d) $x > 1$

19. Which one of the following is correct in respect of the function $f : R \to R^+$ defined as $f(x) = |x + 1|$? [NDA 1 18]

(a) $f(x^2) = [f(x)]^2$

(b) $f(|x|) = |f(x)|$

(c) $f(x + y) = f(x) + f(y)$

(d) None of the above

20. What is the range of the function $f(x) = x + |x|$ if the domain is the set of real numbers? [NDA 1 23]

(a) $(0, \infty)$

(b) $[0, \infty)$

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

(d) $[1, \infty)$

Consider the function:
$f(x) = |x-2| + |3-x| + |4-x|$, where $x \in R$ [NDA 1 23]

21. at what value of x does the function attain minimum value?

(a) 2

(b) 3

(c) 4

(d) 0

22. What is the minimum value of the function?

(a) 2

(b) 3

(c) 4

(d) 0

Greatest Integer Fxn

Consider the following for the next two (02) items that follow: [NDA 1 23]

Let $f(x) = sin[\pi^2]x + cos[-\pi^2]x$, where [.] is GIF fxn.

23. what is $f(\frac{\pi}{2})$ equal to ?

(a) -1

(b) 0

(c) 1

(d) 2

24. what is $f(\frac{\pi}{4})$ equal to ?

(a) $-\frac{1}{\sqrt{2}}$

(b) -1

(c) 1

(d) $\frac{1}{\sqrt{2}}$

25. let z=[y] and y=[x]-x, where [.] is GIF fxn. if x is not an integer but positive, then what is the value of z? [NDA 2 22]

    (a) -1

    (b) 0

    (c) 1

    (d) 2

26. Let [x] denote the greatest integer function. What is the number of solutions of the equation $4x^2 - 4x + [x] = 0$ in the interval [0,2] ? [NDA 1 18]

    (a) $Zero$

    (b) one

    (c) two

    (d) $three$

27. if $f(n) = [\frac{1}{4} + \frac{n}{1000}]$, where [.] is GIF. Then The Value Of $\sum_{n=1}^{1000} f(n)$ is [NDA 2 17]

    (a) 251

    (b) 250

    (c) 1

    (d) 0

Signum Fxn

28. What is the range of the function $f(x) = \frac{|x|}{x}$, where $x \neq 0$? [NDA 1 13]

    (a) set of all real numbers

    (b) set of all integers

    (c) $\{-1, 1\}$

    (d) $\{-1, 0, 1\}$

29. For each non zero real number x, let $f(x) = \frac{x}{|x|}$, the range of function is [NDA 1 15]

    (a) a null set

    (b) a set consisting of only one element

    (c) a set consisting of two element

    (d) a set consisting of infinitely many elements

30. let $f : R \to R$ be defined by $f(x) = \frac{|x|}{x}, x \neq 0$, f(0)=2. what is the range of f? [NDA 2 09]

(a) $\{1, 2\}$
(b) $\{1, -1\}$
(c) $\{-1, 1, 2\}$
(d) $\{1\}$

Trigo Fxn

31. what is the range of $f(x) = cos2x - sin2x$? [NDA 1 11]

(a) $[2, 4]$
(b) $[-1, 1]$
(c) $[-\sqrt{2}, \sqrt{2}]$
(d) $(-\sqrt{2}, 2)$

32. a function is defined by$f(x) = \pi + sin^2x$, then what is the range of the function? [NDA 2 23]

(a) $[0, 1]$
(b) $[\pi, \pi + 1]$
(c) $[\pi - 1, \pi + 1]$
(d) $[\pi - 1, \pi - 1]$

33. if $f(x) = x(4x^2 - 3)$, then what is $f(sin\theta)$ equal to? [NDA 1 23]

(a) $-sin3\theta$
(b) $-cos3\theta$
(c) $sin3\theta$
(d) $-sin4\theta$

34. What is the range of the function $f(x) = 1–sinx$ defined on entire real line? [NDA 2 21]

(a) $(0, 2)$
(b) $[0, 2]$
(c) $(-1, 1)$
(d) $[-1, 1]$

Some other questions based on these fxns:

35. $f(x) = f(x) + f(y)$ is true for all [NDA 2 15]

    (a) Polynomial function

    (b) Trigonometric functions

    (c) Exponential functions

    (d) Logarithmic functions

36. which one of the following real valued fxn is never zero? [NDA 1 08]

    (a) Polynomial function

    (b) Trigonometric functions

    (c) Exponential functions

    (d) Logarithmic functions

37. Let $A = \{7, 8, 9, 10, 11, 12, 13, 14, 15, 16\}$ and let $f : A \to N$ be defined by f(x)=Highest prime factor of x. how many elements are there in the range of f ? [NDA 2 22]

    (a) 4

    (b) 5

    (c) 6

    (d) 7

    5