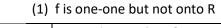
Functions

JEE-MAINS (PREVIOUS YEAR)

MCQ-Single Correct

1.The function f:
$$R \rightarrow \left[-\frac{1}{2}, \frac{1}{2}\right]$$
 defined as $f(x) = \frac{x}{1+x^2}$, is:(1) invertible.(2) injective but not surjective.(3) surjective but not injective.(4) neither injective nor surjective.(3) surjective but not injective.(2) injective but not surjective.(1) 330(2) 165(3) 190(4) 255(3) 190(4) 255(1) contains exactly one element.(2) contains exactly two elements.(3) contains more than two elements(4) is an empty set(3) contains more than two elements(4) is an empty set(1) $(=1, 0) \cup (0, 1)$ (2) $(1, 2)$ (3) $(-2, -1)$ (3) $\frac{1}{1 + \{g(x)\}^5}$ (3) $\frac{1}{1 + \{g(x)\}^5}$ (2014)(4) $1 + \{g(x)\}^5$ (2014)



(2) f is onto R but not one-one

(3) f is one-one and onto R

(4) f is neither one-one nor onto R [2009]

7. Let $f: N \to Y$ be a function defined as f(x) = 4x + 3, where $Y = \{y \in N : y = 4x + 3 \text{ for some } x \in N \}$. Show that f is invertible and its inverse is

(1)
$$g(y) = \frac{3y+4}{4}$$

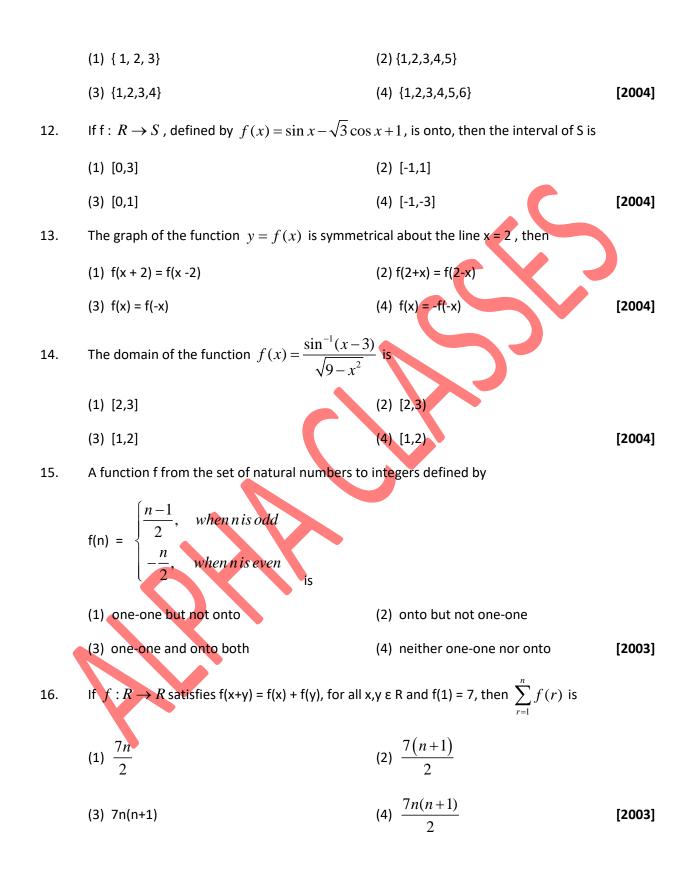
(2) $g(y) = 4 + \frac{y+3}{4}$
(3) $g(y) = \frac{y+3}{4}$
(4) $g(y) = \log \left| \sin \left(x - \frac{\pi}{4}\right) \right| + c$ [2008]
8. The largest interval lying in $\left(-\frac{\pi}{2}, \frac{\pi}{2}\right)$ for which the function
[$f(x) = 4^{-x^2} + \cos^{-1}\left(\frac{x}{2}-1\right) + \log(\cos x)$] is defined, is
(1) $[0, \pi]$
(2) $\left(-\frac{\pi}{2}, \frac{\pi}{2}\right)$
(3) $\left[-\frac{\pi}{4}, \frac{\pi}{2}\right]$
(4) $\left[0, \frac{\pi}{2}\right]$
[2007]
9. Let f: $(-1, 1) \rightarrow B$, be a function defined by $f(x) = \tan^{-1}\left(\frac{2x}{1-x^2}\right)$, then f is both one-one and onto when B is the interval
(1) $\left(0, \frac{\pi}{2}\right)$
(2) $\left[0, \frac{\pi}{2}\right]$
(3) $\left[-\frac{\pi}{2}, \frac{\pi}{2}\right]$
(4) $\left(-\frac{\pi}{2}, \frac{\pi}{2}\right)$
(5) $\left[-\frac{\pi}{2}, \frac{\pi}{2}\right]$
(6) $\left[-\frac{\pi}{2}, \frac{\pi}{2}\right]$
(7) $\left[2005\right]$
10. A real valued function f(x) satisfies the functional equation f(x-y) = f(x) f(y) - f(a - x) f(a + y) where a is a given constant and f(0) = 1, f(2a - x) is equal to
(1) -f(x)
(2) $f(x)$

- (3) f(a) + f(a-x) (4) f(-x)
- 11. The range of the function $f(x) = {}^{7-x}P_{x-3}$ is

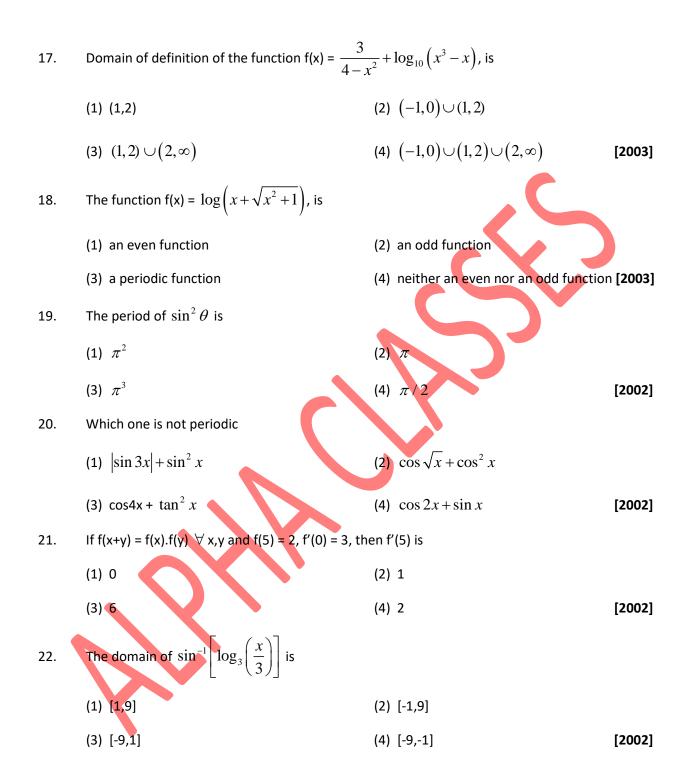


Mathematics for IIT-JEE by MANISH KALIA (B.Tech Delhi College Of Engineering) PH:9878146388,9464551253 | www.iitmathematics.com,www.alphaclasses.com <u>SCO 43,TOP FLOOR,SECTOR 41-D,CHANDIGARH</u>

[2006]









Assertion – Reason Type

1. Let f be a function defined by $f(x) = (x-1)^2 + 1, (x \ge 1)$

Statement – I: The set { $x : f(x) = f^{-1}(x)$ } = {1,2}.

Statement – II : f is bijection and $f^{-1}(x) = 1 + \sqrt{x-1}$, $x \ge 1$.

2. Let $f(x) = (x+1)^2 - 1$, $x \ge -1$

Statement – I: The set { $x : f(x) = f^{-1}(x)$ } = {0,-1}

Statement – II : f is a bijection.

