

SUCCESS KEY TEST SERIES

Work Sheet

Std: 11th Science

Subject: Mathematics & Statistics

Time: 1Hrs

Date :

6.Functions

Max Marks: 40

Q.1 Select and write the most appropriate answers from given alternatives:

10

1) The inverse of function $f(x) = x^3 + 2$ is

(a) $f^{-1}(x) = (x-2)^{1/2}$

(b) $f^{-1}(x) = (x-2)^{1/3}$

(c) $f^{-1}(x) = (x)^{1/3}$

(d) $f^{-1}(x) = (x-2)$

2) Range of $f(x) = \frac{3x+4}{x^2+3}$ is

(a) $\left[-\frac{\sqrt{43}}{6} + \frac{2}{3}, \frac{\sqrt{43}}{6} + \frac{2}{3} \right]$

(b) $\left[-\frac{\sqrt{43}}{6} - \frac{2}{3}, \frac{\sqrt{43}}{6} - \frac{2}{3} \right]$

(c) $\left[-\frac{\sqrt{43}}{6} + \frac{2}{3}, 0 \right]$

(d) $\left[-\frac{\sqrt{43}}{3} + \frac{1}{3}, \frac{\sqrt{43}}{3} + \frac{1}{3} \right]$

3) Find x, if $x = 3^{3\log_3 2}$

4) (1) Consider the following statements.

(I) Every function is a relation.

(II) Every relation is a function.

(a) Only I is correct.

(b) Only II is correct.

(c) Both I and II are correct.

(d) None of the above.

5) From the equation $3x + 5y = 1$, express y as a function of x .

(a) $y = -\frac{3}{5}x - \frac{1}{5}$ (b) $y = -\frac{3}{5}x + \frac{1}{5}$

(c) $y = \frac{3}{5}x + \frac{1}{5}$ (d) $y = -\frac{3}{5}x + 1$

Q.2 Solve the following:

5

1) Express the following logarithmic equations in exponential form

$$\log_{\frac{1}{2}}(8) = -3$$

2) Express the following exponential equations in logarithmic form

$$54^0 = 1$$

3) If $f(x) = \begin{cases} 4x-2, & x \leq -3 \\ 5, & -3 < x < 3 \\ x^2, & x \geq 3 \end{cases}$, then find

$$f(5)$$

4) Find the domain of

$$f(x) = \log_{10}(x^2 - 5x + 6)$$

5) If $f(x) = 2\{x\} + 5x$, where $\{x\}$ is fractional part function of x , then find

$$f(-1)$$

Q.3 Answer the following:

10

1) Let $f: \{2, 4, 5\} \rightarrow \{2, 3, 6\}$ and $g: \{2, 3, 6\} \rightarrow \{2, 4\}$ be given by $f = \{(2, 3), (4, 6), (5, 2)\}$ and $g = \{(2, 4), (3, 4), (6, 2)\}$. Write down $g \circ f$

2) Write the following expressions as sum or difference of logarithms

$$\ln \left(\frac{a^3(a-2)^2}{\sqrt{b^2+5}} \right)$$

3) Solve the following for x , where $|x|$ is modulus function, $[x]$ is greatest interger function, $\{x\}$ is a fractional part function.

$$[x^2] - 5[x] + 6 = 0$$

4) If $f(x) = \begin{cases} x^2 + 3, & x \leq 2 \\ 5x + 7, & x > 2 \end{cases}$, then find

$$f(2)$$

5) Check the injectivity and surjectivity of the following function.

$$f: \mathbb{R} \rightarrow \mathbb{R} \text{ given by } f(x) = x^3$$

Q.4 Solve the following:

15

1) $\log_2 x + \log_4 x + \log_{16} x = \frac{21}{4}$

Solve for x .

2) Solve the following for x , where $|x|$ is modulus function, $[x]$ is greatest integer function, $\{x\}$ is a fractional part function.

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

3) Find the domain if the following function.

$$f(x) = \frac{x^2 + 4x + 4}{x^2 + x - 6}$$

4) Express the area A of circle as a function of its
i. radius r ii. diameter d iii. circumference C.

5) Check if the following functions have an inverse function. If yes, find the inverse function.

$$f(x) = \begin{cases} x + 7 & x < 0 \\ 8 - x & x \geq 0 \end{cases}$$

----- All the Best -----