

SUBJECT – MATHEMATICS , CLASS-XII(STANDARD)
CHAPTER-INCREASING & DECREASING

- 1- The function $f(x) = x^2e^{-x}$ is increasing in
 - a. $x \in (0,2)$
 - b. $x \in (2, \infty)$
 - c. $x < 0$
 - d. none of these
- 2- if the function $f(x) = \tan^{-1}(g(x))$ is increasing in $(0, \frac{\pi}{2})$ then
 - a. $f(x)$ is increasing in $(0, \frac{\pi}{2})$
 - b. $f(x)$ is decreasing in $(0, \frac{\pi}{2})$
 - c. $f(x)$ is increasing in $(0, \frac{\pi}{4})$
 - d. none of these
- 3- $f(x) = |x| - |x - 1|$ is increasing when
 - a. $x < 0$
 - b. $x > 1$
 - c. $x < 1$
 - d. $0 < x < 1$
- 4- $f(x) = \cos x - 2kx$ is decreasing when
 - a. $k < 1/2$
 - b. $k > 1/2$
 - c. $k < 2$
 - d. $k > 2$
- 5- The function $f(x) = x^3 - 9kx^2 + 27x + 30$ is increasing on \mathbb{R} then
 - a. $-1 < k < 1$
 - b. $0 < k < 1$
 - c. $-1 < k < 0$
 - d. none of these
- 6- $f(x) = x^x$ is decreasing in the interval
 - a. $(0, e)$
 - b. $(0, 1)$
 - c. $(1, e)$
 - d. none of these.
- 7- $h(x) = f(x) - (f(x))^2 + (f(x))^3$ for every real x then
 - a. h increase if f increase
 - b. h increase if f decrease
 - c. h decrease if f decrease
 - d. none of these
- 8- $f(x) = \int e^x(x-1)(x-2)dx$. f decrease in the interval
 - a. $(2, 3)$
 - b. $(1, 2)$
 - c. $(-\infty, 1)$
 - d. $(2, \infty)$
- 9- $f(x) = xe^{x(1-x)}$ then $f'(x)$ is
 - a. increase in \mathbb{R}
 - b. decrease in \mathbb{R}
 - c. increase in $(-0.5, 1)$
 - d. none of these
- 10- the length of a longest interval in which $3\sin x - 4\sin^3 x$ is increasing is
 - a. $\frac{\pi}{2}$
 - b. $\frac{\pi}{3}$
 - c. $\frac{3\pi}{2}$
 - d. π .
- 11- Find the set of values of x for which $\log(1+x) < x$.
- 12- Prove that $\sin x + 2x > \frac{3x(x+1)}{\pi}$ when $x \in (0, \frac{\pi}{2})$.
- 13- Find the interval in which $f(x) = \sin x + \cos x$ is decreasing if $x \in (0, 2\pi)$.
- 14- Show that the $x + \frac{1}{x}$ is increasing for $x > 1$.
- 15- Show that for $a > 1$, $f(x) = \sqrt{3}\sin x - \cos x - 2ax + b$ is increasing on \mathbb{R}
- 16- Show that $x^2 - x\sin x$ is an increasing function on $(0, \frac{\pi}{2})$.
- 17- Find the interval in which the function $f(x) = x|x|$ is increasing.
- 18- Find the interval in which $f(x) = \sin x(1 + \cos x)$ is increasing when $x \in (0, \frac{\pi}{2})$.
- 19- Show that $f(x) = \log \sin x$ is decreasing in $(\frac{\pi}{2}, \pi)$
- 20- Show that $f(x) = (x-1)e^x + 1$, is an increasing function for all $x > 0$