



1. Examine whether the following functions are even or odd or none.

(i) $f(x) = \log(x + \sqrt{1 + x^2})$

(ii) $f(x) = \frac{x(a^x + 1)}{a^x - 1}$

(iii) $f(x) = \frac{x}{e^x - 1} + \frac{x}{2} + 1$

(iv) $f(x) = \frac{(1+2^x)^7}{2^x}$

(v) $f(x) = \frac{\sec x + x^2 - 9}{x \sin x}$

(vi) $f(x) = \sqrt{1 + x + x^2} - \sqrt{1 - x + x^2}$

(vii) $f(x) = \begin{cases} x|x| & , \quad x \leq -1 \\ [1+x] - [x-1] & , \quad -1 < x < 1 \\ -x|x| & , \quad x \geq 1 \end{cases}$

(viii) $f(x) = \frac{2x(\sin x + \tan x)}{2\left[\frac{x+2\pi}{\pi}\right] - 3}$

where $[*]$ denotes greatest integer function.

2. Make the graph of the following functions

(i) $f(x) = ||x| - 3|$

(ii) $f(x) = |\ln |x||$

(iii) $f(x) = [|x|]$

(iv) $f(x) = |\{x\}|$

(v) $f(x) = 3\sin\left(x - \frac{\pi}{3}\right)$

(vi) $f(x) = \frac{x^8}{x}$

(vii) $f(x) = x + \sin x$

(viii) $f(x) = (\sin x)^0$

(ix) $f(x) = 3e^{x+5} - 7$

(x) $f(x) = |\sin x| + |\cos x|$

3. If $f(x) = \frac{4^x}{4^x + 2}$, then show that $f(x) + f(1-x) = 1$

4. Find the period of the following functions (where $[*]$ denotes greatest integer function)

(i) $f(x) = 2 + 3\cos(x-2)$

(ii) $f(x) = \sin 3x + \cos^2 x + |\tan x|$

(iii) $f(x) = \sin \frac{\pi x}{4} + \sin \frac{\pi x}{3}$

(iv) $f(x) = \cos \frac{3}{5}x - \sin \frac{2}{7}x$

(v) $f(x) = [\sin 3x] + |\cos 6x|$

(vi) $f(x) = \frac{1}{1-\cos x}$

(vii) $f(x) = \frac{\sin 12x}{1+\cos^2 6x}$

(viii) $f(x) = \sec^2 x + \operatorname{cosec}^3 x$

5. Find the period of the following functions.

(i) $f(x) = 1 - \frac{\sin^2 x}{1+\cot x} - \frac{\cos^2 x}{1+\tan x}$

(ii) $f(x) = \log(2 + \cos 3x)$

(iii) $f(x) = \tan \frac{\pi}{2}[x]$,

where $[*]$ denotes greatest integer function

(iv) $f(x) = e^{\ln \sin x} + \tan^3 x - \operatorname{cosec}(3x-5)$

(v) $f(x) = \frac{1}{2} \left(\frac{|\sin x|}{\cos x} + \frac{\sin x}{|\cos x|} \right)$



Answer Key

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|----------------------|-----------------------|----------------|---------------------------|
| 1. (i) odd | (ii) even | (iii) even | (iv) neither even nor odd |
| (v) even | (vi) odd | (vii) even | (viii) odd |
| 4. (i) 2π | (ii) 2π | (iii) 24 | (iv) 70π |
| (v) $\frac{2\pi}{3}$ | (vi) 2π | (vii) $\pi/12$ | (viii) 2π |
| 5. (i) π | (ii) $\frac{2\pi}{3}$ | (iii) 2 | (iv) 2π |
| (v) 2π | | | |

