

Functions

$$f(x)$$

$$y = f(x)$$

domain \Rightarrow set of values for x

range \Rightarrow set of values for y (or) $f(x)$

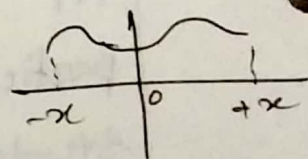
e.g. $y = x^2$ $f(x) = x^3$ $y = 2x + 5$

even function

$$f(x) = f(-x)$$

- the graph of an even function is symmetrical about y axis

e.g. $y = x^2$, $y = \cos x$

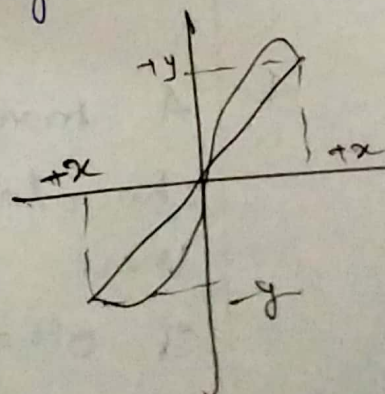


odd function

$$f(x) = -f(-x)$$

- the graph of an odd function is symmetrical about the origin

e.g. $f(x) = x^3$
 $y = \sin x$



- For the function to be defined, the expression under the square root should be non-negative and the denominator of a fraction should not be equal to zero.

- For two functions to be identical, their domains should be equal.

1. Find the domain of the definition of the function,

$$f(x) = (x-2)^{1/2} + (8-x)^{1/2}$$

- (a) all values except $2 \leq x \leq 8$ (b) $2 \leq x$
(c) $2 \leq x \leq 8$ (d) $x \leq 8$

2. $y = \frac{1}{(4-x^2)^{1/2}}$

- (a) $(-2 < x < 2)$ (b) $(2, -2)$
(c) $(-\infty, -2) \cup (2, \infty)$ (d) $(2, \infty)$

3. $y = \frac{1}{x^2 - 4x + 3}$

- (a) $1 \leq x \leq 3$ (b) $x = (1, 3)$
(c) $-\infty < x < \infty$ excluding 1, 3 (d) None of these

4. Which of the following is an even function?

- a) $|x^2| - 5x$ b) $x^4 + x^5$ (c) $e^{2x} + e^{-2x}$ d) $\frac{e^x + e^{-x}}{e^x - e^{-x}}$

5. If $f(x) = \frac{1}{x}$, $g(x) = \frac{1}{1-x}$, $h(x) = x^2$ then find

$$f \circ g \circ h(2)$$

- (a) 3 (b) $\frac{1}{3}$ (c) -3 (d) $-\frac{1}{3}$

6. for any function $f^n(x) = f^{n-1}(f(x))$ for $n > 1$

$$g(x) = \frac{1}{\sqrt{x}} \quad h(x) = \sqrt{x} \quad k(x) = x^2$$

$$\text{find } g[h^3(k^2(x))]$$

- (a) $\frac{1}{\sqrt{x}}$ (b) \sqrt{x} (c) $-\frac{1}{\sqrt{x}}$ (d) None of these

7. $f(x) = f(x-2) - f(x-1) \quad x \in \mathbb{N}$

$$f(1) = 0; \quad f(2) = 1 \quad \text{find } f(7) + f(4)$$

- (a) 5 (b) -5 (c) -6 (d) 6