

$$g(-x) = -g(x) \Rightarrow \text{odd}$$

~~Q1) f(x) = x^2~~

chapter 1 practise exercises

Functions questions

$$1) A(r) = \pi r^2, r > 0, C(r) = 2r\pi, r > 0$$

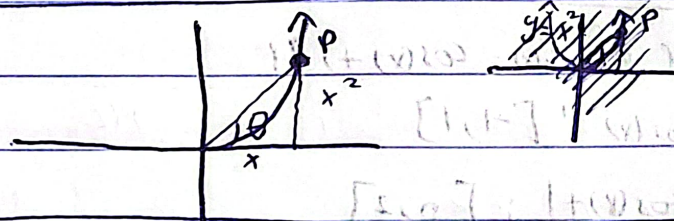
$$g(r) = \frac{C(r) \cdot r}{2}, r > 0$$

$$2) r^2 = \sqrt{\frac{A}{4\pi}} = \frac{1}{2} \sqrt{\frac{A}{\pi}}$$

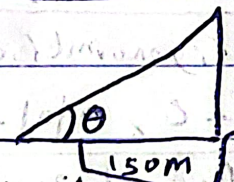
$$A = \frac{3V}{r} = \frac{3V}{\frac{1}{2} \sqrt{\frac{A}{\pi}}} = \frac{(3V)^2}{\frac{1}{4} A} \Rightarrow A = \frac{(3V)^2}{\frac{1}{4} A} \Rightarrow A^2 = 4(3V)^2 \Rightarrow A = 2(3V)$$

$$3) x: P_1 = \tan \theta$$

$$y: P_2 = \tan^2 \theta$$



$$4) \tan \theta = \frac{y}{150} \Rightarrow y = 150 \tan \theta$$



5 → 8, determine if the graph of the function is symmetric about the y-axis, the origin, or neither?

$$5) y = x^3 \Rightarrow y_1 = (-x)^3 = -x^3 = -y_1 \Rightarrow \text{odd} \Rightarrow \text{symmetric about the origin}$$

$$6) y = x^2 \Rightarrow y_1 = \sqrt{(-x)^2} = x^2 = y_1, \text{ even} \Rightarrow \text{symmetric about the y-axis}$$

Chapter 1: practice exercises

7) $y = x^2 - 2x - 1$, $y_1 = (-x)^2 + 2x - 1 = x^2 + 2x - 1 \Rightarrow$ neither
 $x = -x$

8) $y = e^{-x^2}$, $y_1 = e^{-(-x)^2} = e^{-x^2} = y_1 \Rightarrow$ even $\Rightarrow$ symmetric about y-axis
 $x = -x$ $x = x$

9-16 determine if it is odd or even or neither.

9) $y = x^2 + 1$, $y_1 = (-x)^2 + 1 = x^2 + 1 = y_1 \Rightarrow$ even
 $x = -x$ $x = x$

10) $y = x^5 - x^3 - x$, $y_1 = -x^5 + x^3 + x = -(y_1) \Rightarrow$ odd
 $x = -x$ $x = x$

11) $y = 1 - \cos x$, $y_1 = 1 - \cos(-x) = 1 - \cos x = y_1 \Rightarrow$ even
 $x = -x$ $x = x$

12) $y = \sec x \tan x$, $y_1 = \sec(-x) \tan(-x) = -\sec x \tan x = -y_1 \Rightarrow$ odd
 $x = -x$ $x = x$

13) $y = \frac{x^4 + 1}{x^3 - 2x}$, $y_1 = \frac{(-x)^4 + 1}{-x^3 + 2x} = \frac{x^4 + 1}{-x^3 + 2x} = -y_1 \Rightarrow$ odd
 $x = -x$ $x = x$

14) $y = x - \sin x$, $y_1 = -x + \sin(-x) = -x - \sin x = -(x - \sin x) = -y_1 \Rightarrow$ odd
 $x = -x$ $x = x$

15) $y = x + \cos x$, $y_1 = -x + \cos(-x) = -x + \cos x \neq y_1 \neq -y_1 \Rightarrow$ neither
 $x = -x$ $x = -x$

16) $y = x \cos x$, $y_1 = -x \cos(-x) = -x \cos x = -y_1 \Rightarrow$ odd
 $x = -x$ $x = x$

17) a. $f \cdot g \Rightarrow f(x) \cdot g(-x) = -f(x)$, $g(x) = f \cdot g \Rightarrow$ even

b. $f^3 \Rightarrow f(x) \cdot f(-x) \cdot f(-x) = -f(x)$, $f^3(x) = -f^3(x) \Rightarrow$ odd

c. $f(\sin x) \Rightarrow f(\sin(-x)) = f(-\sin x) \Rightarrow$ odd $\Rightarrow$ odd

d. $g(\sec x) \Rightarrow g(\sec(-x)) = g(\sec x) \Rightarrow$ even

e. $|g| \Rightarrow |g(-x)| = |g(x)| = |g(x)| \Rightarrow$ even

18) $g(x) = f(x+a)$

$g(-x) = f(-x+a) = f(a-x) = g(x) \Rightarrow$ even

19-28, find domain and range?

19) $y = |x| - 2$

D: $\mathbb{R}$

R: $[-2, \infty)$

chapter 1a practise exercises

20. $y = -2 + \sqrt{1-x}$

D: $1-x \geq 0 \Rightarrow x \leq 1$

R: $[-2, \infty)$

24. $y = 2e^{-x} - 3$

D: $(-\infty, \infty)$

R: $(-3, \infty)$

25. $y = 2\sin(3x + \pi) - 1$

D: $(-\infty, \infty)$

R: $[-3, 1]$

21. $y = \sqrt{16-x^2} \Rightarrow 16-x^2 \geq 0 \Rightarrow 16 \geq x^2 \Rightarrow -4 \leq x \leq 4$

D: $[-4, 4]$

R: $[0, 4]$ (semicircle with radius = 4)

26. $y = x^{\frac{2}{5}}$

D: $(-\infty, \infty)$

R: $(0, \infty)$

22. $y = 3^{2-x} + 1$

D: $\mathbb{R}$

R: $(1, \infty)$

27. $y = \ln(x-3) + 1$

D: $x-3 > 0 \Rightarrow x > 3$

R: $(-\infty, \infty)$

28. $y = \tan(2x - \pi)$

$2x \neq n\pi \Rightarrow x \neq n\frac{\pi}{2}$

D: $\mathbb{R} - \{n\frac{\pi}{2}, n \in \mathbb{Z}\}$

R: $(-\infty, \infty)$

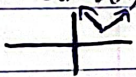
29. $y = \sqrt[3]{2-x} - 1$

D: $\mathbb{R}$

R: $\mathbb{R}$

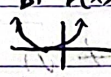
29) a. increasing, b. increasing, c. decreasing, d. increasing

30) a. $f(x) = |x-2| + 1$



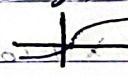
increasing on $[2, \infty)$

b. $f(x) = (x+1)^9$



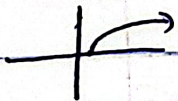
increasing on $(-1, \infty)$

c. $g(x) = (3x-1)^{\frac{1}{3}}$



increasing on $\mathbb{R}$

d. $R(x) = \sqrt{2x-1}$ increasing on $[\frac{1}{2}, \infty)$



Find domain and range:

31) $y = \sqrt{x}$ $-4 \leq x \leq 0$

$\sqrt{x}$

$0 \leq x \leq 4$

D: $[-4, 4]$

R: $[0, 2]$

32) $y = \begin{cases} -x-2, & -2 \leq x \leq -1 \\ x, & -1 < x \leq 1 \\ 2-x, & 1 < x \leq 2 \end{cases}$

D: $[-2, 2]$

R: $[-1, 1]$

33) $f(x) = \begin{cases} -x+1, & 0 \leq x < 1 \\ -x+2, & 1 \leq x \leq 2 \end{cases}$

34) $g(x) = \begin{cases} \frac{5}{2}x, & 0 \leq x \leq 2 \\ -\frac{5}{2}x, & 2 \leq x \leq 4 \end{cases}$

(0, 5]