

Mathematics Department
MATH1411 - Worksheet #1

Name: _____

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Q₁:- Prove the following

- 1] If $f(x)$ is even and $g(x)$ is odd, then $(f \circ g)(x)$ is even
- 2] If $f(x)$ is even and $g(x)$ is odd, then $(f \pm g)(x)$ is neither even nor odd
- 3] If $f(x)$ is odd and $g(x)$ is odd, then $(f \pm g)(x)$ is odd
& $(f \cdot g)(x)$ is even

Q₂:- Find the Domain and Range

1] $f(x) = 2 \sin(\pi x) + 3$

2] $h(t) = 2 + \frac{t^2}{t^2 + 4}$

3] $f(x) = \sqrt{4 - (x-1)^2}$ "half of circle"

4] $f(x) = \frac{1}{\sin^2 x}$

Find the period of the following functions

① $f(x) = \tan\left(\frac{\pi}{2}x\right) + 3$

② $f(x) = \cos\left(\frac{\pi}{2}x + \pi\right) + 3$

③ $f(x) = \sin\left(\frac{\pi}{2}x + \pi x\right) + 3$

Q4. Is the following function odd, even or neither

$$f(x) = |x| \cos x + x^3$$

Short answer - Worksheet #1 - Ch.1: Functions

Q2 □ $D: (-\infty, \infty)$
 $R: [1, 5]$

□ $D: (-\infty, \infty)$
 $R: [2, 3)$

□ $D: \begin{matrix} [-1, 3] \\ \cancel{[0, 4]} \end{matrix}$
 $R: [0, 2]$

□ $D: \mathbb{R} \setminus \{n\pi, n: 0, \pm 1, \pm 2, \dots\}$
 $R: [1, \infty)$

Q3: ① period = 2 ② period = 4 ③ period = $\frac{4}{3}$

Q4 $f(-x) = |x| \cos(x) - x^3$ $f(x)$ neither even nor odd.