

Problem 1

State the domain and range of each of the following functions and whether they are even/odd/neither:

1. $f(x) = x$
2. $f(x) = x^2$
3. $f(x) = \sin(x)$
4. $f(x) = \frac{x^4+x^2-3}{x^2-1}$
5. $f(x) = \frac{x+1}{x^2-1}$

Problem 2

Sketch $f(x) = x^2$. Is it even or odd? Does this function have an inverse?

Problem 3

Sketch each of the following, making sure to label where it crosses the x/y axes and say whether it is increasing/decreasing, odd/even, none of the above.

1. $f(x) = \frac{1}{x}$
2. $f(x) = \tan(x)$
3. (Hard) $f(x) = \sin(\frac{1}{x})$

Problem 4

The composition of two functions $f(x), g(x)$ is a function $h = f \circ g$ defined as $h(x) = f(g(x))$.

1. Is it the case that $f \circ g = g \circ f$?
2. If f, g are odd, is $f \circ g$ odd?
3. If f, g are even, is $f \circ g$ even?