

ASSIGNMENT 2

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Question 1(i)

$$f : R \rightarrow R, f(x) = x^3 \quad (1)$$

$$g : R \rightarrow R, g(x) = 2x^2 + 1 \quad (2)$$

R is the set of Real Numbers. Find $f \circ g(x)$ and $g \circ f(x)$.

Solution

Lets find $f \circ g(x)$

$$f(x) = x^3, g(x) = 2x^2 + 1$$

$$\implies f(g(x)) = (2x^2 + 1)^3 \quad (3)$$

$$\implies f \circ g(x) = 8x^6 + 12x^4 + 6x^2 + 1, x \in R \quad (4)$$

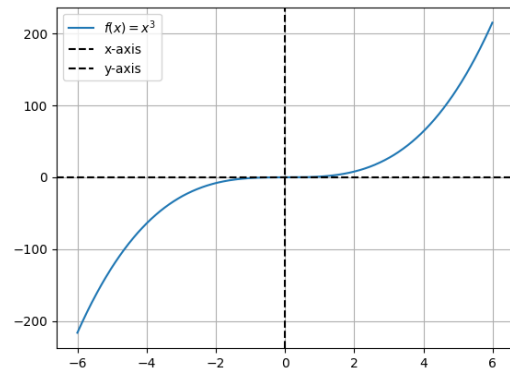


Figure 1: $f(x)=x^3$

Lets find $g \circ f(x)$

$$f(x) = x^3, g(x) = 2x^2 + 1$$

$$\implies g(f(x)) = 2(x^3)^2 + 1 \quad (5)$$

$$\implies g \circ f(x) = 2x^6 + 1, x \in R \quad (6)$$

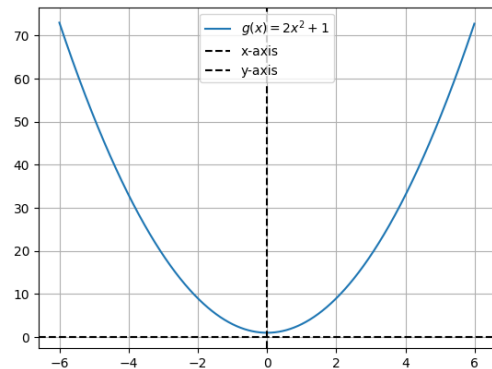


Figure 2: $g(x)=2x^2 + 1$

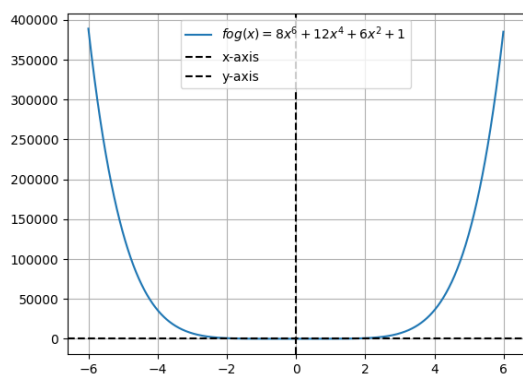


Figure 3: $fog(x) = 8x^6 + 12x^4 + 6x^2 + 1$

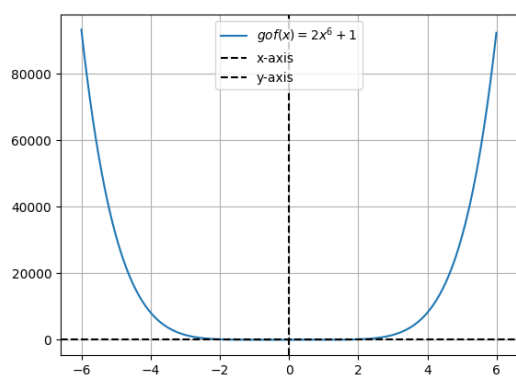


Figure 4: $gof(x) = 2x^6 + 1$