ASSIGNMENT 2

Abhishek Kumar
AI21BTECH11003

April 2022

Question 1(i)

$$f : R \to R, f(x) = x^3 \tag{1}$$
$$g : R \to R, g(x) = 2x^2 + 1 \tag{2}$$

R is the set of Real Numbers.Find $fog(x)$ and $gof(x)$.

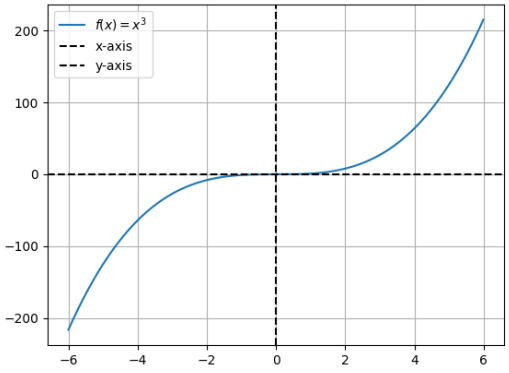

Figure 1: $f(x) = x^3$

Solution

Lets find $fog(x)$

$$f(x) = x^3, g(x) = 2x^2 + 1$$
$$\implies f(g(x)) = (2x^2 + 1)^3 \tag{3}$$
$$\implies fog(x) = 8x^6 + 12x^4 + 6x^2 + 1, x \in R \tag{4}$$

Lets find $gof(x)$

$$f(x) = x^3, g(x) = 2x^2 + 1$$
$$\implies g(f(x)) = 2(x^3)^2 + 1 \tag{5}$$
$$\implies fog(x) = 2x^6 + 1, x \in R \tag{6}$$

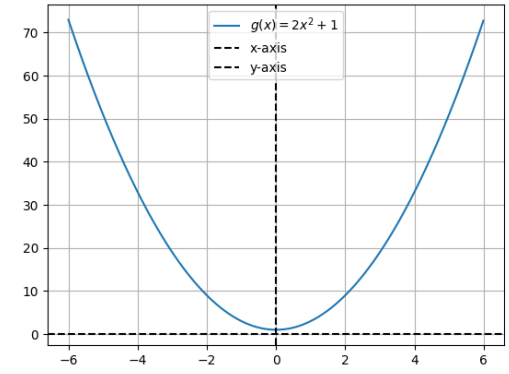

Figure 2: $g(x) = 2x^2 + 1$

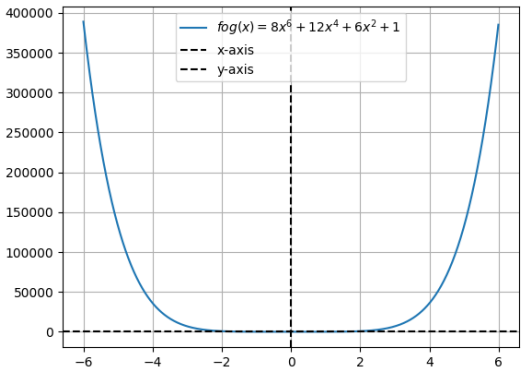

Figure 3: $fog(x) = 8x^6 + 12x^4 + 6x^2 + 1$

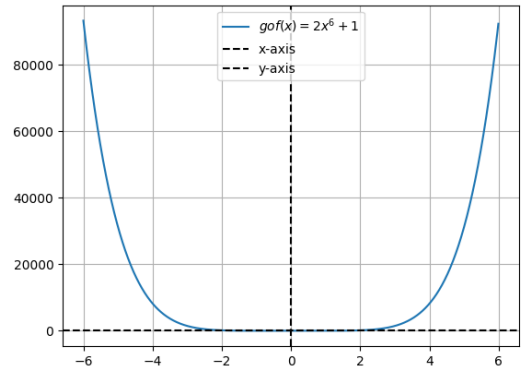

Figure 4: $gof(x) = 2x^6 + 1$