



COMSATS University Islamabad

Department of Computer Science

Assignment # 1

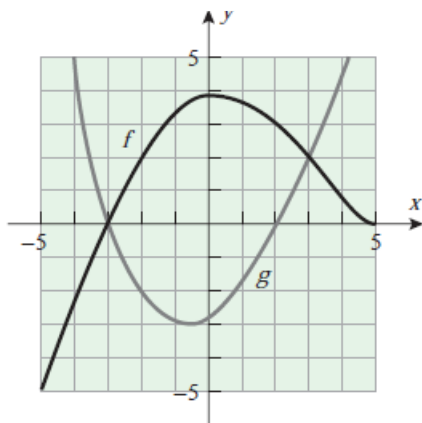
Calculus and Analytical Geometry (MTH-101)

Issue Date: 05-04-2022 Due Date: 12-04-2022

Question 1:

Use the graphs of the functions f and g in the accompanying figure to solve the following problems.

- (a) Find the values of $f(-2)$ and $g(3)$.
- (b) For what values of x is $f(x) = g(x)$?
- (c) For what values of x is $f(x) < 2$?
- (d) What are the domain and range of f ?
- (e) What are the domain and range of g ?



Question 2:

Sketch the graph of the equation $x^2 - 9y^2 = 0$.

Question 3:

Sketch the graph of the equation by translating, reflecting, compressing, and stretching the graph of y appropriately, and then use the graphical utility to confirm your sketch is correct.

$$y + 4 = x^{2/3}$$

$$f_1(x) = -2(x+1)^2 - 1;$$

$$g(x) = x^2$$

$$f_2(x) = |2x-3|+2;$$

$$g(x) = |x|$$

$$f_3(x) = 1 + 2\sqrt{x-2};$$

$$g(x) = \sqrt{x}$$

$$f_4(x) = \sin(2x); \quad 0 < x < 2\pi$$

$$g(x) = \sin x$$

$$f_5(x) = 2\sin(x); \quad 0 < x < 2\pi$$

$$g(x) = \sin x$$

$$f_6(x) = \sin\left(\frac{x}{2}\right); \quad -2\pi < x < 2\pi$$

$$g(x) = \sin x$$

$$f_7(x) = \frac{1}{2}\sin\left(x - \frac{\pi}{2}\right); \quad -2\pi < x < 2\pi$$

$$g(x) = \sin x$$

Also determine the function(s) which are not one-to-one.

(ii): (a): Let $f(x) = \frac{x^3}{x^2+1}$. Find x if $f^{-1}(x) = 2$

(b): Let $f(x) = -\sqrt{3-2x}$. Find $f^{-1}(x)$

Question 4: Find the (a) domain and (b) range.

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

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

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

$$y = x^{2/5}$$

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

Question 5: Write a piecewise formula for the following functions.

