



National University of Computer & Emerging Sciences Islamabad

Department of Computer Sciences Calculus and Analytical Geometry Assignment # 1

Due Date: 25-09-2021

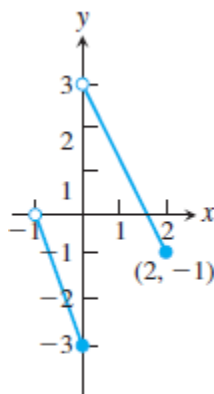
Course Instructor: Dr Sehrish Hassan Shigri

Instructions: Submit your scanned handwritten assignments on Google classroom as a single pdf file. Write your Name, Roll number and Section clearly on each page of your assignment.

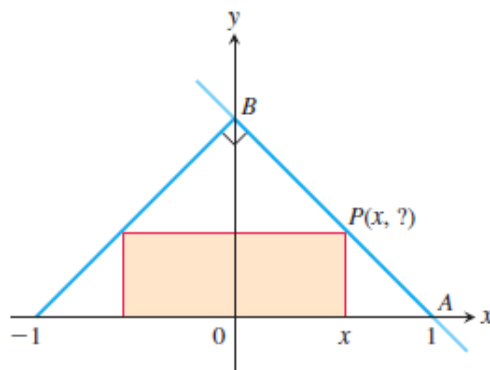
1. Graph the function and find the zeros and the domain and the range:

$$f(x) = \sqrt[3]{9 - x^2} - 1$$

2. Find the equation of the new curve C obtained when the graph of the curve C with the equation $x^2 - 12x + 3y = 1$ is reflected in the origin.
3. A function $f(x) = 1/x$ is transformed into a new function $R(x)$. To form the new function $R(x)$, $f(x)$ is horizontally translated 4 units to the right, translated $1/2$ units up, and compressed vertically $3/2$ units. Write the equation of the new function $f(x)$ and sketch the graph.
4. Find a formula for the graph of the function.



5. The figure shows a rectangle inscribed in an isosceles right angled triangle whose hypotenuse is 2 units long.
 - i) Express the y -coordinate of P in terms of x .
 - ii) Express the area of the rectangle in terms of x .



6. Given $F(x) = \cos^2(x + 9)$, find functions f , t and h such that $F = f \circ t \circ h$.
7. Determine which of the following functions are one-to-one. Find the inverses of functions, whenever possible. For each inverse function, determine its domain and range. Justify your answers.
 - i) $y = \frac{4x-1}{2x+3}$
 - ii) $y = \frac{1}{1+e^{-x}}$
8. Trigonometric functions are not one-to-one (their values repeat periodically). How are the inverse trigonometric functions defined? Also state the domain and range of all trigonometric functions.
9. Solve for y in terms of x . Then graph the function using a graphing tool. State the domain and range of that function using the graph.

$$\ln(y - 1) - \ln(2) = x + \ln(x)$$

10. A NASA Goddard Institute for Space Studies report gives the annual global mean land-ocean temperature index for the years 1880 to the present. The index number is the difference between the mean temperature over the base years 1951–1980 and the actual temperature for the year recorded. For the recorded year, a positive index is the number of degrees Celsius above the base; a negative index is the number below the base. The table lists the index for the years 1940–2010 in 5-year intervals, reported in the NASA data set.

Year	Index (°C)	Year	Index (°C)
1940	0.04	1980	0.20
1945	0.06	1985	0.05
1950	−0.16	1990	0.36
1955	−0.11	1995	0.39
1960	−0.01	2000	0.35
1965	−0.12	2005	0.62
1970	0.03	2010	0.63
1975	−0.04		

Use a graphing utility to make a scatterplot of the data.