# BRAC University

## FUNCTION: DOMAIN & RANGE

## PROBLEMS

Find out the domain and range of the following functions:

**1.** $f(x) = \dfrac{1}{x}$      **2.** $f(x) = \sqrt{x}$      **3.** $f(x) = |x|$      **4.** $f(x) = \dfrac{2x}{x-4}$

**5.** $f(x) = \sin x$      **6.** $f(x) = \cos x$      **7.** $f(x) = \ln x$      **8.** $f(x) = e^x$

**9.** $f(x) = \sin 2x$      **10.** $f(x) = \cos 2x$      **11.** $f(x) = \ln(x-1)$      **12.** $f(x) = e^{x-1}$

**13.** $f(x) = \dfrac{1}{x-3}$      **14.** $f(x) = \sqrt{x^2 - 9}$      **15.** $f(x) = \sqrt{9 - x^2}$      **16.** $f(x) = \dfrac{x-4}{x}$

**17.** $f(x) = \dfrac{1}{5x+7}$      **18.** $f(x) = \sqrt{x^2 - 5x + 6}$      **19.** $f(x) = \sqrt{9 + x^2}$      **20.** $f(x) = \dfrac{x}{x}$

**21.** $f(x) = \dfrac{|x|}{x}$      **22.** $f(x) = \dfrac{x}{|x|}$      **23.** $f(x) = \ln(x^2 + 1)$      **24.** $f(x) = -\sqrt{x^2 - 7x + 10}$

**25.** $f(x) = \begin{cases} x^2 & x < 0 \\ x & 0 \le x \le 1 \\ \dfrac{1}{x} & x > 1 \end{cases}$      **26.** $f(x) = \begin{cases} 2x + 6 & -3 \le x < 0 \\ 6 & 0 \le x \le 2 \\ 2x - 6 & 2 < x \le 5 \end{cases}$

**27.** $f(x) = \begin{cases} x + 2 & x \le -1 \\ 6 & -1 \le x < 1 \\ 2x - 6 & x > 1 \end{cases}$      **28.** $f(x) = \begin{cases} x + 2 & x < -1 \\ 6 & -1 \le x \le 1 \\ 2x - 6 & x > 1 \end{cases}$

**29.** $f(x) = \begin{cases} \dfrac{x^2 - 1}{x - 1} & x \ne 1 \\ 2 & x = 1 \end{cases}$

Try to sketch the above functions. You are instructed to study worked out examples and problems from reference books as well to improve your concept.