

Activity 28

OBJECTIVE

To find analytically $\lim_{x \rightarrow c} f(x) = \frac{x^2 - c^2}{x - c}$

MATERIAL REQUIRED

Pencil, white paper, calculator.

METHOD OF CONSTRUCTION

1. Consider the function f given by $f(x) = \frac{x^2 - 9}{x - 3}$

2. In this case $c = 3$ and the function is not defined at $x = 3$.

DEMONSTRATION

1. Take some values of c less than $c = 3$ and some other values of c more than $c = 3$.

2. In both cases, the values to be taken have to be very close to $c = 3$.

3. Calculate the corresponding values of f at each of the values of c taken close to $c = 3$.

DEMONSTRATION : TABLE 1

1. Write the values of $f(x)$ in the following tables:

Table 1

x	2.9	2.99	2.999	2.9999	2.99999	2.999999
$f(x)$	5.9	5.99	5.999	5.9999	5.99999	5.999999

Table 2

x	3.1	3.01	3.001	3.0001	3.00001	3.000001
$f(x)$	6.1	6.01	6.001	6.0001	6.00001	6.000001

OBSERVATION

1. Values of $f(x)$ as $x \rightarrow 3$ from the left, as in Table 1 are coming closer and closer to _____.
2. Values of $f(x)$ as $x \rightarrow 3$ from the right, as in Table 2 are coming closer and closer to _____ from tables (2) and (3), $\lim_{x \rightarrow 3} f(x) = \frac{x^2 - 9}{x - 3} = \underline{\hspace{2cm}}$.

APPLICATION

This activity can be used to demonstrate the concept of a limit $\lim_{x \rightarrow c} f(x)$ when $f(x)$ is not defined at $x = c$.