

LIMITS AND DERIVATIVES

LIMITS

Determine the limits for the following in Questions 1 to 4.

Q.1 $\lim_{z \rightarrow 1} \frac{z^{\frac{1}{3}} - 1}{z^{\frac{1}{6}} - 1}$

Q.2 $\lim_{x \rightarrow 1} \frac{ax^2 + bx + c}{cx^2 + bx + a}, a + b + c \neq 0$

Q.3 $\lim_{x \rightarrow \pi} \frac{\sin(\pi - x)}{\pi(\pi - x)}$

Q.4 $\lim_{r \rightarrow 1} \pi r^2$

Q.5 Find $\lim_{x \rightarrow 1} f(x)$, where $f(x) = \begin{cases} 2x + 3 & x \leq 0 \\ 3(x + 1) & x > 0 \end{cases}$

Q.6 If the function $f(x)$ satisfies $\lim_{x \rightarrow 1} \frac{f(x) - 2}{x^2 - 1} = \pi$, evaluate $\lim_{x \rightarrow 1} f(x)$

ANSWER KEY

1. 2

2. 1

3. $\frac{1}{\pi}$

4. π

5. $\lim_{x \rightarrow 1} = 6$

6. $\lim_{x \rightarrow 1} f(x) = 2$