

EXERCISE 29.2

Evaluate the following limits:

1. $\lim_{x \rightarrow 1} \frac{x^2 + 1}{x + 1}$

Solution:

Given:

$$\lim_{x \rightarrow 1} \frac{x^2 + 1}{x + 1}$$

Let us substitute the value of x directly in the given limit, we get

$$\begin{aligned} \lim_{x \rightarrow 1} \frac{x^2 + 1}{x + 1} &= \frac{1^2 + 1}{1 + 1} \\ &= 2 / 2 \\ &= 1 \end{aligned}$$

∴ The value of the given limit is 1.

2. $\lim_{x \rightarrow 0} \frac{2x^2 + 3x + 4}{x^2 + 3x + 2}$

Solution:

Given:

$$\lim_{x \rightarrow 0} \frac{2x^2 + 3x + 4}{x^2 + 3x + 2}$$

Let us substitute the value of x directly in the given limit, we get

$$\begin{aligned} \lim_{x \rightarrow 0} \frac{2x^2 + 3x + 4}{x^2 + 3x + 2} &= \frac{2(0^2) + 3(0) + 4}{0^2 + 3(0) + 2} \\ &= 4 / 2 \\ &= 2 \end{aligned}$$

∴ The value of the given limit is 2.

3. $\lim_{x \rightarrow 3} \frac{\sqrt{2x + 3}}{x + 3}$

Solution:

Given:

$$\lim_{x \rightarrow 3} \frac{\sqrt{2x+3}}{x+3}$$

Let us substitute the value of x directly in the given limit, we get

$$\begin{aligned}\lim_{x \rightarrow 3} \frac{\sqrt{2x+3}}{x+3} &= \frac{\sqrt{2(3)+3}}{3+3} \\ &= \sqrt{9/6} \\ &= 3/6 \\ &= 1/2\end{aligned}$$

∴ The value of the given limit is 1/2.

4. $\lim_{x \rightarrow 1} \frac{\sqrt{x+8}}{\sqrt{x}}$

Solution:

Given:

$$\lim_{x \rightarrow 1} \frac{\sqrt{x+8}}{\sqrt{x}}$$

Let us substitute the value of x directly in the given limit, we get

$$\begin{aligned}\lim_{x \rightarrow 1} \frac{\sqrt{x+8}}{\sqrt{x}} &= \frac{\sqrt{1+8}}{1} \\ &= \frac{\sqrt{9}}{1} \\ &= 3\end{aligned}$$

∴ The value of the given limit is 3.

$$5. \lim_{x \rightarrow a} \frac{\sqrt{x} + \sqrt{a}}{x + a}$$

Solution:

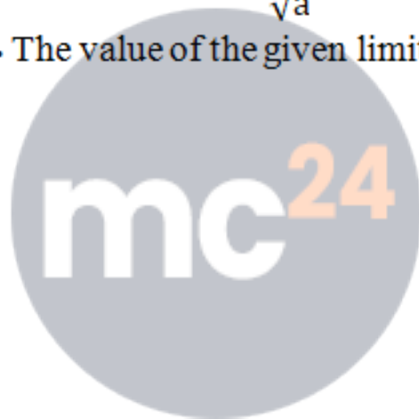
Given:

$$\lim_{x \rightarrow a} \frac{\sqrt{x} + \sqrt{a}}{x + a}$$

Let us substitute the value of x directly in the given limit, we get

$$\begin{aligned} \lim_{x \rightarrow a} \frac{\sqrt{x} + \sqrt{a}}{x + a} &= \frac{\sqrt{a} + \sqrt{a}}{a + a} \\ &= \frac{2\sqrt{a}}{2a} \\ &= \frac{1}{\sqrt{a}} \end{aligned}$$

∴ The value of the given limit is $1/\sqrt{a}$.



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