

RD Sharma
Solutions
Class 11 Maths
Chapter 29
Ex 29.3

Limits Ex 29.3 Q1

$$\lim_{x \rightarrow -5} \frac{2x^2 + 9x - 5}{x + 5} = \lim_{x \rightarrow -5} \frac{(x + 5)(2x - 1)}{(x + 5)} = \lim_{x \rightarrow -5} (2x - 1) = 2(-5) - 1 = -10 - 1 = -11$$

Limits Ex 29.3 Q2

$$\begin{aligned} \lim_{x \rightarrow 3} \frac{x^2 - 4x + 3}{x^2 - 2x - 3} &= \lim_{x \rightarrow 3} \frac{x^2 - 3x - x + 3}{x^2 + x - 3x - 3} \\ &= \lim_{x \rightarrow 3} \frac{x(x - 1) - 3(x - 1)}{x(x + 1) - 3(x + 1)} \\ &= \lim_{x \rightarrow 3} \frac{(x - 1)(x - 3)}{(x + 1)(x - 3)} \\ &= \lim_{x \rightarrow 3} \frac{x - 1}{x + 1} \\ &= \frac{3 - 1}{3 + 1} \\ &= \frac{2}{4} = \frac{1}{2} \end{aligned}$$

Limits Ex 29.3 Q3

$$\lim_{x \rightarrow 3} \frac{x^4 - 81}{x^2 - 9} = \lim_{x \rightarrow 3} \frac{(x^2 - 9)(x^2 + 9)}{(x^2 - 9)} = \lim_{x \rightarrow 3} x^2 + 9 = (3)^2 + 9 = 9 + 9 = 18$$

Limits Ex 29.3 Q4

$$\lim_{x \rightarrow 2} \frac{x^3 - 8}{x^2 - 4} = \lim_{x \rightarrow 2} \frac{(x - 2)(x^2 + 4 + 2x)}{(x - 2)(x + 2)} = \frac{(2)^2 + 4 + 2(2)}{2 + 2} = \frac{4 + 4 + 4}{4} = \frac{12}{4} = 3$$

Limits Ex 29.3 Q5

$$\begin{aligned}\lim_{x \rightarrow -\frac{1}{2}} \frac{8x^3 + 1}{2x + 1} &= \lim_{x \rightarrow -\frac{1}{2}} \frac{8 \left(x^3 + \frac{1}{8} \right)}{2 \left(x + \frac{1}{2} \right)} \\ &= \frac{8}{2} \lim_{x \rightarrow -\frac{1}{2}} \frac{\left(x^3 + \left(\frac{1}{2} \right)^3 \right)}{x + \frac{1}{2}} \\ &= 4 \lim_{x \rightarrow -\frac{1}{2}} \frac{\left(x + \frac{1}{2} \right) \left(x^2 + \frac{1}{4} - \frac{1}{2}x \right)}{\left(x + \frac{1}{2} \right)} \\ &= 4 \left(\left(\frac{-1}{2} \right)^2 + \frac{1}{4} - \frac{1}{2} \left(\frac{-1}{2} \right) \right) \\ &= 4 \left(\frac{1}{4} + \frac{1}{4} + \frac{1}{4} \right) \\ &= 3\end{aligned}$$

Limits Ex 29.3 Q6

$$\begin{aligned}\lim_{x \rightarrow 4} \frac{x^2 - 7x + 12}{x^2 - 3x - 4} &= \lim_{x \rightarrow 4} \frac{x^2 - 3x - 4x + 12}{x^2 + x - 4x - 4} \\ &= \lim_{x \rightarrow 4} \frac{x(x-3) - 4(x-3)}{x(x+1) - 1(x+1)} \\ &= \lim_{x \rightarrow 4} \frac{(x-3)(x-4)}{(x-4)(x+1)} \\ &= \lim_{x \rightarrow 4} \frac{x-3}{x+1} \\ &= \frac{4-3}{4+1} \\ &= \frac{1}{5}\end{aligned}$$

Limits Ex 29.3 Q7

$$\begin{aligned}\lim_{x \rightarrow 2} \frac{x^4 - 16}{x - 2} &= \lim_{x \rightarrow 2} \frac{(x^2 - 4)(x^2 + 4)}{(x - 2)} \\ &= \lim_{x \rightarrow 2} \frac{(x - 2)(x + 2)(x^2 + 4)}{(x - 2)} \\ &= \lim_{x \rightarrow 2} (x + 2)(x^2 + 4) \\ &= (2 + 2)(4 + 4) \\ &= 4(8) \\ &= 32\end{aligned}$$

Limits Ex 29.3 Q8

$$\begin{aligned}\lim_{x \rightarrow 5} \frac{x^2 - 9x + 20}{x^2 - 6x + 5} &= \lim_{x \rightarrow 5} \frac{x^2 - 4x - 5x + 20}{x^2 - x - 5x + 5} \\ &= \lim_{x \rightarrow 5} \frac{x(x - 4) - 5(x - 4)}{x(x - 1) - 5(x - 1)} \\ &= \lim_{x \rightarrow 5} \frac{(x - 5)(x - 4)}{(x - 5)(x - 1)} \\ &= \lim_{x \rightarrow 5} \frac{x - 4}{x - 1} \\ &= \frac{5 - 4}{5 - 1}\end{aligned}$$

$$= \frac{1}{4}$$

Limits Ex 29.3 Q9

$$\lim_{x \rightarrow -1} \frac{x^3 + 1}{x + 1}$$

$$= \lim_{x \rightarrow -1} \frac{(x + 1)(x^2 - x + 1)}{(x + 1)}$$

$$[a^3 + b^3 = (a + b)(a^2 + b^2 - ab)]$$

$$= \lim_{x \rightarrow -1} (x^2 - x + 1)$$

$$= (-1)^2 - (-1) + 1$$

$$= 1 + 1 + 1$$

$$= 3$$

Limits Ex 29.3 Q10

$$\lim_{x \rightarrow 5} \frac{x^3 - 125}{x^2 - 7x + 10} = \lim_{x \rightarrow 5} \frac{(x - 5)(x^2 + 25 + 5x)}{(x - 2)(x - 5)} = \frac{(5)^2 + 25 + 5(5)}{(5 - 2)} = \frac{25 + 25 + 25}{3} = \frac{75}{3} = 25$$

Limits Ex 29.3 Q11

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

Limits Ex 29.3 Q12

$$\begin{aligned}\lim_{x \rightarrow \sqrt{3}} \frac{x^2 - 3}{x^2 + 3\sqrt{3}x - 12} &= \lim_{x \rightarrow \sqrt{3}} \frac{(x - \sqrt{3})(x + \sqrt{3})}{x^2 + 4\sqrt{3}x - \sqrt{3}x - 12} \\ &= \lim_{x \rightarrow \sqrt{3}} \frac{(x - \sqrt{3})(x + \sqrt{3})}{x(x + 4\sqrt{3}) - \sqrt{3}(x + 4\sqrt{3})} \\ &= \lim_{x \rightarrow \sqrt{3}} \frac{(x - \sqrt{3})(x + \sqrt{3})}{(x - \sqrt{3})(x + 4\sqrt{3})} \\ &= \frac{\sqrt{3} + \sqrt{3}}{\sqrt{3} + 4\sqrt{3}} = \frac{2\sqrt{3}}{5\sqrt{3}} \\ &= \frac{2}{5}\end{aligned}$$

Limits Ex 29.3 Q13

$$\begin{aligned}\lim_{x \rightarrow \sqrt{3}} \frac{x^4 - 9}{x^2 + 4\sqrt{3}x - 15} &= \lim_{x \rightarrow \sqrt{3}} \frac{(x - \sqrt{3})(x + \sqrt{3})(x^2 + 3)}{(x - \sqrt{3})(x + 5\sqrt{3})} = \lim_{x \rightarrow \sqrt{3}} \frac{(x + \sqrt{3})(x^2 + 3)}{(x + 5\sqrt{3})} \\ &= \frac{(\sqrt{3} + \sqrt{3})(3 + 3)}{(\sqrt{3} + 5\sqrt{3})} = \frac{(2\sqrt{3})(6)}{6\sqrt{3}} = 2\end{aligned}$$

Limits Ex 29.3 Q14

$$\begin{aligned}\lim_{x \rightarrow 2} \left(\frac{x}{x-2} - \frac{4}{x^2-2x} \right) \\ &= \lim_{x \rightarrow 2} \left(\frac{x}{x-2} - \frac{4}{x(x-2)} \right) \\ &= \lim_{x \rightarrow 2} \left(\frac{x(x) - 4}{x(x-2)} \right) \\ &= \lim_{x \rightarrow 2} \left(\frac{x^2 - 4}{x(x-2)} \right) \\ &= \lim_{x \rightarrow 2} \frac{(x-2)(x+2)}{x(x-2)} \\ &= \lim_{x \rightarrow 2} \frac{(x+2)}{x} \\ &= \frac{2+2}{2} \\ &= \frac{4}{2} \\ &= 2\end{aligned}$$