

Limit Fungsi Aljabar

1. $\lim_{x \rightarrow 2} \frac{x^2 - 4}{x^3 + 1} = \dots$

Jawab :

$$\lim_{x \rightarrow 2} \frac{x^2 - 4}{x^3 + 1} = \frac{4 - 4}{8 + 1} = 0$$

2. $\lim_{x \rightarrow 3} \frac{x^2 + 3x - 18}{x^2 - 3x} = \dots$

Jawab :

$$\lim_{x \rightarrow 3} \frac{(x+6)(x-3)}{x(x-3)} = \frac{3+6}{3} = 3$$

3. $\lim_{t \rightarrow 4} \frac{\sqrt{t} - 2}{t - 4} = \dots$

Jawab :

$$\lim_{t \rightarrow 4} \frac{\sqrt{t} - 2}{(\sqrt{t} - 2)(\sqrt{t} + 2)} = \frac{1}{2 + 2} = \frac{1}{4}$$

4. $\lim_{x \rightarrow 3} \frac{9 - x^2}{4 - \sqrt{x^2 + 7}} = \dots$

Jawab :

$$\lim_{x \rightarrow 3} \frac{16 - (x^2 + 7)}{4 - \sqrt{x^2 + 7}} = \lim_{x \rightarrow 3} \frac{(4 - \sqrt{x^2 + 7})(4 + \sqrt{x^2 + 7})}{4 - \sqrt{x^2 + 7}} = 4 + 4 = 8$$

5. $\lim_{x \rightarrow \infty} \frac{x^2 - 4}{x^3 + 1} = \dots$

Jawab :

$$\lim_{x \rightarrow \infty} \frac{x^2}{x^3} = \lim_{x \rightarrow \infty} \frac{1}{x} = 0$$

$$6. \quad \lim_{x \rightarrow \infty} \frac{(4+5x)(2-x)}{(2+x)(1-x)} = \dots$$

Jawab :

$$\lim_{x \rightarrow \infty} \frac{-5x^2}{-x^2} = 5$$

$$7. \quad \lim_{x \rightarrow \infty} \sqrt{x^2 + x + 5} - \sqrt{x^2 - 2x + 3} = \dots$$

Jawab :

$$\lim_{x \rightarrow \infty} \sqrt{ax^2 + bx + c} - \sqrt{ax^2 + px + q} = \frac{b-p}{2\sqrt{a}}$$

$$\lim_{x \rightarrow \infty} \sqrt{x^2 + x + 5} - \sqrt{x^2 - 2x + 3} = \frac{1+2}{2\sqrt{1}} = \frac{3}{2}$$

$$8. \quad \lim_{x \rightarrow 3} \frac{x^2 + x - 6}{x^2 + 5x + 6} = \dots$$

Jawab :

$$\lim_{x \rightarrow 3} \frac{x^2 + x - 6}{x^2 + 5x + 6} = \frac{9+3-6}{9+15+6} = \frac{1}{5}$$

$$9. \quad \lim_{x \rightarrow 1} \frac{2x^2 - x - 1}{3x^2 - x - 2} = \dots$$

Jawab :

$$\lim_{x \rightarrow 1} \frac{4x-1}{6x-1} = \frac{3}{5} \quad (\text{Menggunakan bantuan turunan})$$

$$10. \quad \lim_{x \rightarrow 1} \frac{1-x^2}{x-1} = \dots$$

Jawab :

$$\lim_{x \rightarrow 1} \frac{-2x}{1} = -2$$

$$11. \lim_{x \rightarrow 1} \frac{2x^2 - 2}{x - 1} = \dots\dots$$

Jawab :

$$\lim_{x \rightarrow 1} \frac{4x}{1} = 4$$

$$12. \lim_{t \rightarrow 2} \frac{t^3 - 8}{t^2 + t - 6} = \dots\dots$$

Jawab :

$$\lim_{t \rightarrow 2} \frac{3t^2}{2t + 1} = \frac{12}{5}$$

$$13. \lim_{x \rightarrow 1} \frac{(3x - 1)^2 - 4}{x^2 + 4x - 5} = \dots\dots$$

Jawab :

$$\lim_{x \rightarrow 1} \frac{18x - 6}{2x + 4} = \frac{12}{6} = 2$$

$$14. \lim_{x \rightarrow 2} \left(\frac{2x^2 - 8}{x - 2} + \frac{x^2 - 2x}{2x - 4} \right) = \dots\dots$$

Jawab :

$$\lim_{x \rightarrow 2} \left(\frac{(x - 2)(2x + 4)}{x - 2} + \frac{x(x - 2)}{2(x - 2)} \right) = 4 + 4 + \frac{2}{2} = 9$$

$$15. \lim_{x \rightarrow 2} \left(\frac{6 - x}{x^2 - 4} - \frac{1}{x - 2} \right) = \dots\dots$$

Jawab :

$$\lim_{x \rightarrow 2} \frac{-2(x - 2)}{(x - 2)(x + 2)} = \frac{-2}{4} = -\frac{1}{2}$$

$$16. \lim_{x \rightarrow 0} \frac{6x^2 - 4x}{2x^2 + x} = \dots$$

Jawab :

$$\lim_{x \rightarrow 0} \frac{12x - 4}{4x + 1} = \frac{-4}{1} = -4$$

$$17. \lim_{x \rightarrow 1} \frac{x - 1}{1 - \sqrt{x}} = \dots$$

Jawab :

$$\lim_{x \rightarrow 1} \frac{1}{-\frac{1}{2\sqrt{x}}} = -\frac{1}{\frac{1}{2}} = -2$$

$$18. \lim_{x \rightarrow 4} \frac{x^2 - 16}{\sqrt{x} - 4} = \dots$$

Jawab :

$$\lim_{x \rightarrow 4} \frac{(\sqrt{x} - 4)^2 (x + 4)}{\sqrt{x} - 4} = \lim_{x \rightarrow 4} \sqrt{x} - 4 (x + 4) = 0.8 = 0$$

$$19. \lim_{x \rightarrow 0} \frac{3 - \sqrt{2x + 9}}{x} = \dots$$

Jawab :

$$\lim_{x \rightarrow 0} \frac{3 - \sqrt{2x + 9}}{x} \cdot \frac{3 + \sqrt{2x + 9}}{3 + \sqrt{2x + 9}} = \lim_{x \rightarrow 0} \frac{9 - 2x - 9}{x(3 + \sqrt{2x + 9})} = \frac{-2}{3 + 3} = -\frac{1}{3}$$

$$20. \lim_{x \rightarrow 3} \frac{x^2 - 9}{\sqrt{x^2 + 16} - 5} = \dots$$

Jawab :

$$\lim_{x \rightarrow 3} \frac{(\sqrt{x^2 + 16} - 5)(\sqrt{x^2 + 16} + 5)}{\sqrt{x^2 + 16} - 5} = 5 + 5 = 10$$

$$21. \lim_{x \rightarrow 0} \frac{\sqrt{x} - x}{\sqrt{x} + x} = \dots\dots$$

Jawab :

$$\lim_{x \rightarrow 0} \frac{\sqrt{x}(1 - \sqrt{x})}{\sqrt{x}(1 + \sqrt{x})} = \frac{1 - 0}{1 + 0} = 1$$

$$22. \lim_{x \rightarrow 3} \frac{\sqrt{6x-2} - \sqrt{3x+7}}{x-3} = \dots\dots$$

Jawab :

$$\begin{aligned} \lim_{x \rightarrow 3} \frac{\sqrt{6x-2} - \sqrt{3x+7}}{x-3} &= \frac{\sqrt{6x-2} - \sqrt{3x+7}}{x-3} \cdot \frac{\sqrt{6x-2} + \sqrt{3x+7}}{\sqrt{6x-2} + \sqrt{3x+7}} \\ &= \lim_{x \rightarrow 3} \frac{3(x-3)}{(x-3)(\sqrt{6x-2} + \sqrt{3x+7})} = \frac{3}{8} \end{aligned}$$

$$23. \lim_{x \rightarrow 0} \frac{2x^2 - 5x}{3 - \sqrt{9+x}} = \dots\dots$$

Jawab :

$$\lim_{x \rightarrow 0} \frac{2x^2 - 5x}{3 - \sqrt{9+x}} \cdot \frac{3 + \sqrt{9+x}}{3 + \sqrt{9+x}} = \frac{x(2x-5)(3 + \sqrt{9+x})}{-x} = \frac{-5(3+3)}{-1} = 30$$

$$24. \lim_{x \rightarrow 1} \frac{\sqrt{x^2+3} - x - 1}{1 - x^2} = \dots\dots$$

Jawab :

$$\lim_{x \rightarrow 1} \frac{\sqrt{x^2+3} - (x+1)}{1 - x^2} \cdot \frac{\sqrt{x^2+3} + (x+1)}{\sqrt{x^2+3} + (x+1)} = \lim_{x \rightarrow 1} \frac{2(1-x)}{(1-x)(1+x)(\sqrt{x^2+3} + x + 1)} = \frac{1}{4}$$

$$25. \lim_{x \rightarrow 1} \frac{\sqrt[3]{x^2} - 2\sqrt[3]{x} + 1}{(x-1)^2} = \dots\dots$$

Jawab :

$$\lim_{x \rightarrow 1} \frac{(\sqrt[3]{x} - 1)^2}{(\sqrt[3]{x} - 1)(\sqrt[3]{x^2} + \sqrt[3]{x} + 1)^2} = \frac{1}{(1+1+1)^2} = \frac{1}{9}$$