

Universidad
Técnica

8,00

Ambato

Facultad de Contabilidad y
Auditoria

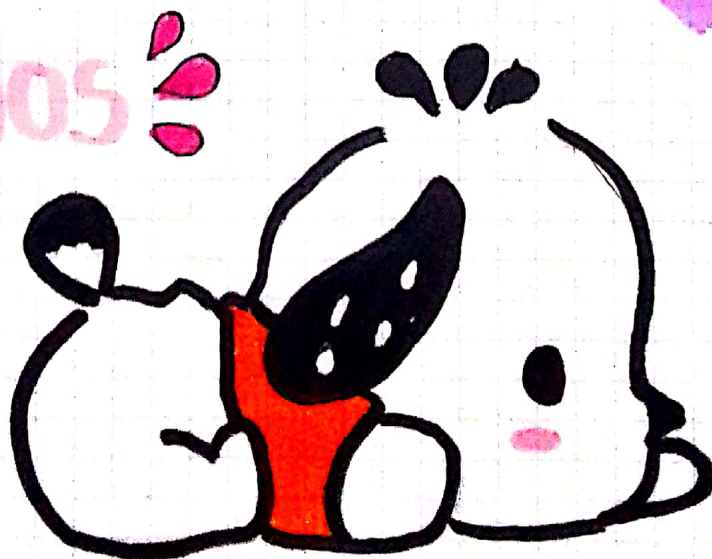
Carrera de Economía

Cattleya Guevara

2 Semestre "A"

09 / 11 / 2024

EJERCICIOS



$$1) \lim_{r \rightarrow 1} \frac{r^2 - r}{2r^2 + 5r - 7}$$

$$\lim_{r \rightarrow 1} \frac{1^2 - 1}{2(1)^2 + 5(1) - 7}$$

$$\lim_{r \rightarrow 1} \frac{1 - 1}{7 - 7}$$

$$\lim_{r \rightarrow 1} \frac{0}{0} \quad \text{Indeterminación}$$

$$\lim_{r \rightarrow 1} \frac{r^2 - r}{2r^2 + 5r - 7}$$

$$\lim_{r \rightarrow 1} \frac{r(1-1)}{(2r+7)(1-1)}$$

$$\lim_{r \rightarrow 1} \frac{r}{2r+7}$$

$$\lim_{r \rightarrow 1} \frac{1}{2(1)+7}$$

$$\lim_{r \rightarrow 1} \frac{1}{2+7}$$

$$\lim_{r \rightarrow 1} \frac{1}{9}$$

$$2) \lim_{k \rightarrow 4} \frac{k^2 - 16}{\sqrt{k} - 2}$$

$$\lim_{k \rightarrow 4} \frac{4^2 - 16}{\sqrt{4} - 2}$$

$$\lim_{k \rightarrow 4} \frac{16 - 16}{2 - 2}$$

$$\lim_{k \rightarrow 4} \frac{0}{0} \quad \text{Indeterminación}$$

$$\lim_{k \rightarrow 4} \frac{k^2 - 16}{\sqrt{k} - 2}$$

$$\lim_{k \rightarrow 4} \frac{(k-4)(k+4)}{\sqrt{k} - 2}$$

$$\lim_{k \rightarrow 4} \frac{(\sqrt{k}-2)(\sqrt{k}+2)(k+4)}{(\sqrt{k}-2)}$$

$$\lim_{k \rightarrow 4} (\sqrt{k} - 2)(k + 4)$$

$$\lim_{k \rightarrow 4} (\sqrt{4} - 2)(4 + 4)$$

$$\lim_{k \rightarrow 4} (4)(8)$$

$$\lim_{k \rightarrow 4} 32$$

$$3) \lim_{x \rightarrow -3} \frac{x+3}{x^2 - x - 12}$$

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

$$\lim_{x \rightarrow -3} \frac{0}{9+3-12}$$

$$\lim_{x \rightarrow -3} \frac{0}{0} \text{ Indeterminado}$$

$$\lim_{x \rightarrow -3} \frac{x+3}{x^2 - x - 12}$$

$$\lim_{x \rightarrow -3} \frac{\cancel{x+3}}{(x-4)(\cancel{x+3})}$$

$$\lim_{x \rightarrow -3} \frac{1}{x-4}$$

$$\lim_{x \rightarrow -3} \frac{1}{(-3)-4}$$

$$\lim_{x \rightarrow -3} \frac{1}{-7}$$

$$\lim_{x \rightarrow -3} -\frac{1}{7}$$

$$4) \lim_{x \rightarrow -3} \frac{2x^2 + 5x - 3}{3x^2 + 11x + 6}$$

$$\lim_{x \rightarrow -3} \frac{2(-3)^2 + 5(-3) - 3}{3(-3)^2 + 11(-3) + 6}$$

$$\lim_{x \rightarrow -3} \frac{18 - 15 - 3}{27 - 33 + 6}$$

$\frac{0}{0}$ Indeterminado

$$\lim_{x \rightarrow -3} \frac{2x^2 + 5x - 3}{3x^2 + 11x + 6}$$

$$\lim_{x \rightarrow -3} \frac{(x+3)(2x-1)}{(x+3)(3x+2)}$$

$$\lim_{x \rightarrow -3} \frac{2x-1}{3x+2}$$

$$\lim_{x \rightarrow -3} \frac{2(-3)-1}{3(-3)+2}$$

$$\lim_{x \rightarrow -3} \frac{2(-3)-1}{3(-3)+2}$$

$$\lim_{x \rightarrow -3} \frac{-6-1}{-9+2}$$

$$\lim_{x \rightarrow -3} \frac{-7}{-7}$$

$$\lim_{x \rightarrow -3} 1$$

5) $\lim_{x \rightarrow 5} \frac{\sqrt{x-1} - 2}{x-5}$

$$\lim_{x \rightarrow 5} \frac{\sqrt{5-1} - 2}{5-5}$$

$$\lim_{x \rightarrow 5} \frac{2-2}{0}$$

$\frac{0}{0}$ Indeterminado

$$\lim_{x \rightarrow 5} \frac{\sqrt{x-1} - 2}{x-5} \cdot \frac{\sqrt{x-1} + 2}{\sqrt{x-1} + 2}$$

$$\lim_{x \rightarrow 5} \frac{(\sqrt{x-1})^2 - 2^2}{(x-5)(\sqrt{x-1} + 2)}$$

$$\lim_{x \rightarrow 5} \frac{x-1-4}{(x-5)(\sqrt{x-1} + 2)}$$

$$\lim_{x \rightarrow 5} \frac{x-5}{(x-5)(\sqrt{x-1} + 2)}$$

$$\lim_{x \rightarrow 5} \frac{1}{(\sqrt{x-1} + 2)}$$

$$\lim_{x \rightarrow 5} \frac{1}{\sqrt{4} + 2}$$

$$\lim_{x \rightarrow 5} \frac{1}{4}$$

$$b) \lim_{x \rightarrow 4} \frac{\sqrt{x+5} - 3}{x-4}$$

$$\lim_{x \rightarrow 4} \frac{\sqrt{4+5} - 3}{4-4}$$

$$\lim_{x \rightarrow 4} \frac{\sqrt{9} - 3}{0}$$

$$\lim_{x \rightarrow 4} \frac{3-3}{0}$$

$$\lim_{x \rightarrow 4} \frac{0}{0} \text{ Indeterminado}$$

$$\lim_{x \rightarrow 4} \left[\frac{\sqrt{x+5} - 3}{x-4} \cdot \frac{\sqrt{x+5} + 3}{\sqrt{x+5} + 3} \right]$$

$$\lim_{x \rightarrow 4} \left[\frac{(\sqrt{x+5})^2 - 3^2}{(x-4)(\sqrt{x+5} + 3)} \right]$$

$$\lim_{x \rightarrow 4} \left[\frac{x+5-9}{(x-4)(\sqrt{x+5} + 3)} \right]$$

$$\lim_{x \rightarrow 4} \left[\frac{\cancel{x}-4}{(x-\cancel{4})(\sqrt{x+5} + 3)} \right]$$

$$\lim_{x \rightarrow 4} \left[\frac{1}{(\sqrt{x+5} + 3)} \right]$$

$$\lim_{x \rightarrow 4} \frac{1}{\sqrt{4+5} + 3}$$

$$\lim_{x \rightarrow 4} \frac{1}{6}$$

$$7) \lim_{x \rightarrow 0} \frac{x^2}{\sqrt{1+x} - 1}$$

$$\lim_{x \rightarrow 0} \frac{0^2}{\sqrt{1+0} - 1}$$

$$\lim_{x \rightarrow 0} \frac{0}{\sqrt{1} - 1}$$

$$\lim_{x \rightarrow 0} \frac{0}{0} \quad \text{Indeterminado}$$

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

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

$$\lim_{x \rightarrow 0} \frac{x^2 \cdot (\sqrt{1+x} + 1)}{x}$$

$$\lim_{x \rightarrow 0} x \cdot (\sqrt{1+x} + 1)$$

$$\lim_{x \rightarrow 0} 0 \cdot (1+1)$$

$$\lim_{x \rightarrow 0} 0$$

$$8) \lim_{x \rightarrow -3} \frac{x^2 + 8x + 15}{x^2 - x - 12}$$

$$\lim_{x \rightarrow -3} \frac{(-3)^2 + 8(-3) + 15}{(-3)^2 - (-3) - 12}$$

$$\lim_{x \rightarrow -3} \frac{9 - 24 + 15}{9 + 3 - 12}$$

$$\lim_{x \rightarrow -3} \frac{0}{0} \quad \text{Indeterminado}$$

$$\lim_{x \rightarrow -3} \frac{x^2 + 8x + 15}{x^2 - x - 12}$$

$$\frac{x^2 + 8x + 15}{(x+5)(x+3)}$$

$$\frac{x^2 - 1x - 12}{(x-4)(x+3)}$$

$$\lim_{x \rightarrow -3} \frac{(x+5)(x+3)}{(x-4)(x+3)}$$

$$\lim_{x \rightarrow -3} \frac{x+5}{x-4}$$

$$\lim_{x \rightarrow -3} \frac{-3+5}{-3-4}$$

$$\lim_{x \rightarrow -3} \frac{2}{-7}$$

$$9) \lim_{x \rightarrow 2} \frac{3x^2 - 5x - 2}{x^2 - 4}$$

$$\lim_{x \rightarrow 2} \frac{3(2)^2 - 5(2) - 2}{(2)^2 - 4}$$

$$\lim_{x \rightarrow 2} \frac{3(4) - 10 - 2}{4 - 4}$$

$$\lim_{x \rightarrow 2} \frac{12 - 10 - 2}{0}$$

$$\lim_{x \rightarrow 2} \frac{0}{0} \text{ Indeterminación}$$

$$\lim_{x \rightarrow 2} \frac{3x^2 - 5x - 2}{x^2 - 4}$$

$$3x^2 - 5x - 2 = (3x - 6)(3x + 1) = (x - 2)(3x + 1)$$

$$\lim_{x \rightarrow 2} \frac{\cancel{(x-2)}(3x+1)}{\cancel{(x-2)}(x+2)}$$

$$\lim_{x \rightarrow 2} \frac{3(2)+1}{2+2}$$

$$\lim_{x \rightarrow 2} \frac{6+1}{4}$$

$$\lim_{x \rightarrow 2} \frac{7}{4}$$

$$10) \lim_{x \rightarrow \frac{2}{3}} \frac{9x^2 - 4}{3x - 2}$$

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

$$\lim_{x \rightarrow \frac{2}{3}} \frac{9(\frac{4}{9}) - 4}{2 - 2}$$

$$\lim_{x \rightarrow \frac{2}{3}} \frac{4 - 4}{2 - 2}$$

$$\lim_{x \rightarrow \frac{2}{3}} \frac{0}{0} \text{ Indeterminado}$$

$$\lim_{x \rightarrow \frac{2}{3}} \frac{9x^2 - 4}{3x - 2}$$

$$9x^2 - 4 = (3x - 2)(3x + 2)$$

$$\begin{array}{cc} \downarrow & \downarrow \\ 3x & 2 \end{array}$$

$$\lim_{x \rightarrow \frac{2}{3}} \frac{\cancel{(3x - 2)}(3x + 2)}{\cancel{3x - 2}}$$

$$\lim_{x \rightarrow \frac{2}{3}} (3x + 2)$$

$$\lim_{x \rightarrow \frac{2}{3}} 3\left(\frac{2}{3}\right) + 2$$

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

$$\lim_{x \rightarrow \frac{2}{3}} 4$$

$$11) \lim_{x \rightarrow 3} \frac{x^3 - 6x^2 + 9x}{x^2 - 9}$$

$$\lim_{x \rightarrow 3} \frac{(3)^3 - 6(3)^2 + 9(3)}{(3)^2 - 9}$$

$$\lim_{x \rightarrow 3} \frac{27 - 6(9) + 27}{9 - 9}$$

$$\lim_{x \rightarrow 3} \frac{27 - 54 + 27}{0}$$

$$\lim_{x \rightarrow 3} \frac{0}{0} \text{ Indeterminado}$$

$$\lim_{x \rightarrow 3} \frac{x^3 - 6x^2 + 9x}{x^2 - 9}$$

$$\textcircled{N} \frac{x^3 - 6x^2 + 9x}{x(x-3)^2} = \frac{x(x^2 - 6x + 3^2)}{x(x-3)^2} \rightarrow \frac{3}{6x}$$

$\downarrow$
 x

$$\textcircled{D} (x+3)(x-3)$$

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

$$\lim_{x \rightarrow 3} \frac{3(0)}{6}$$

$$\lim_{x \rightarrow 3} \frac{0}{6}$$

$$\lim_{x \rightarrow 3} 0$$

$$12) \lim_{x \rightarrow 2} \frac{2x^2 - 3x - 2}{x^3 - 2x^2 - 3x + 6}$$

$$\lim_{x \rightarrow 2} \frac{2(2)^2 - 3(2) - 2}{(2)^3 - 2(2)^2 - 3(2) + 6}$$

$$\lim_{x \rightarrow 2} \frac{2(4) - 6 - 2}{8 - 4 - 6 + 6}$$

$$\lim_{x \rightarrow 2} \frac{8 - 6 - 2}{8 - 4 - 6 + 6}$$

$$\lim_{x \rightarrow 2} \frac{0}{0} \text{ Indeterminado}$$

$$\lim_{x \rightarrow 2} \frac{2x^2 - 3x - 2}{x^3 - 2x^2 - 3x + 6}$$

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

$$\textcircled{D} \frac{x^3 - 2x^2 - 3x + 6}{(x^3 - 2x^2) - (3x - 6)}$$

$$\frac{x^2(x-2) - 3(x-2)}{(x-2)(x^2-3)}$$

$$\lim_{x \rightarrow 2} \frac{\cancel{(x-2)}(2x+1)}{\cancel{(x-2)}(x^2-3)}$$

$$\frac{2x+1}{x^2-3}$$

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

$$\lim_{x \rightarrow 2} 5$$

$$13) \lim_{x \rightarrow -3} \frac{x^2 + 4x + 3}{x + 3}$$

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

$$\lim_{x \rightarrow -3} \frac{9 - 12 + 3}{-3 + 3}$$

$$\lim_{x \rightarrow -3} \frac{0}{0} \text{ Indeterminado}$$

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

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

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

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

$$-2$$

$$14) \lim_{x \rightarrow 1} \frac{\sqrt[3]{x} - 1}{x - 1}$$

$$\lim_{x \rightarrow 1} \frac{\sqrt[3]{1} - 1}{1 - 1}$$

$$\lim_{x \rightarrow 1} \frac{0}{0}$$

Indeterminado.

$$\lim_{x \rightarrow 1} \frac{\sqrt[3]{x} - 1}{x - 1}$$

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

$$(\sqrt[3]{x} - 1)(\sqrt[3]{x^2} + \sqrt[3]{x} + 1)$$

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

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

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

$$\lim_{x \rightarrow 1} \frac{1}{3}$$

$$15) \lim_{x \rightarrow -2} \frac{y^3 + 3y^2 + 2y}{y^2 - y - 6}$$

$$\lim_{x \rightarrow -2} \frac{(-2)^3 + 3(-2)^2 + 2(-2)}{(-2)^2 - (-2) - (-2)}$$

$$\lim_{x \rightarrow -2} \frac{-8 + 12 - 4}{4 + 2 - 6}$$

$$\lim_{x \rightarrow -2} \frac{0}{0} \quad \text{Indeterminado}$$

$$\lim_{x \rightarrow -2} \frac{y^3 + 3y^2 + 2y}{y^2 - y - 6}$$

$$\lim_{x \rightarrow -2}$$

$$y^3 + 3y^2 + 2y = y(y^2 + 3y + 2) = y(y+1)(y+2)$$

$$ax^2 + bx + c = a(x-x_1)(x-x_2)$$

$$y^2 - y - 6 = (y-3)(y+2)$$

$$\lim_{x \rightarrow -2} \frac{y(y+1)(y+2)}{(y-3)(y+2)}$$

$$\lim_{x \rightarrow -2} \frac{y(y+1)}{y-3}$$

$$\lim_{x \rightarrow -2} \frac{-2(-2+1)}{-2-3}$$

$$\lim_{x \rightarrow -2} \frac{-2 \cdot (-1)}{-5}$$

$$\lim_{x \rightarrow -2} -\frac{2}{5}$$

$$16) \lim_{x \rightarrow 0} \frac{x^5 - 4x^4}{2x^3 - 4x^2}$$

$$\lim_{x \rightarrow 0} \frac{(0)^5 - 4(0)^4}{2(0)^3 - 4(0)^2}$$

$$\lim_{x \rightarrow 0} \frac{0 - 0}{0 - 0}$$

$$\lim_{x \rightarrow 0} \frac{0}{0}$$

$$\lim_{x \rightarrow 0} \frac{x^5 - 4x^4}{2x^3 - 4x^2}$$

$$\lim_{x \rightarrow 0} \frac{x^4(x-4)}{x^2(2x-4)}$$

$$\lim_{x \rightarrow 0} \frac{x^2(x-4)}{2x-4}$$

$$\lim_{x \rightarrow 0} \frac{0^2(0-4)}{2(0)-4}$$

$$\lim_{x \rightarrow 0} \frac{0}{-4}$$

$$\lim_{x \rightarrow 0} 0$$

$$17) \lim_{x \rightarrow 0} \frac{x^2}{\sqrt{1+x} - 1}$$

$$\lim_{x \rightarrow 0} \frac{0^2}{\sqrt{1+0} - 1}$$

$$\lim_{x \rightarrow 0} \frac{0}{\sqrt{1} - 1}$$

$$\lim_{x \rightarrow 0} \frac{0}{0} \text{ Indeterminado}$$

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

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

$$\lim_{x \rightarrow 0} \frac{x^2 \cdot (\sqrt{1+x} + 1)}{x}$$

$$\lim_{x \rightarrow 0} x \cdot (\sqrt{1+x} + 1)$$

$$\lim_{x \rightarrow 0} 0 \cdot (1+1)$$

$$\lim_{x \rightarrow 0} 0$$

$$18) \lim_{x \rightarrow -3} \frac{x^2 + 8x + 15}{x^2 - x - 12}$$

$$\lim_{x \rightarrow -3} \frac{(-3)^2 + 8(-3) + 15}{(-3)^2 - (-3) - 12}$$

$$\lim_{x \rightarrow -3} \frac{9 - 24 + 15}{9 + 3 - 12}$$

$$\lim_{x \rightarrow -3} \frac{0}{0} \text{ Indeterminado}$$

$$\lim_{x \rightarrow -3} \frac{x^2 + 8x + 15}{x^2 - x - 12}$$

$$\frac{x^2 + 8x + 15}{(x+5)(x+3)}$$

$$\frac{x^2 - 1x - 12}{(x-4)(x+3)}$$

$$\lim_{x \rightarrow -3} \frac{(x+5)(x+3)}{(x-4)(x+3)}$$

$$\lim_{x \rightarrow -3} \frac{x+5}{x-4}$$

$$\lim_{x \rightarrow -3} \frac{-3+5}{-3-4}$$

$$\lim_{x \rightarrow -3} -\frac{2}{7}$$

$$19) \lim_{x \rightarrow 2} \frac{3x^2 - 5x - 2}{x^2 - 4}$$

$$\lim_{x \rightarrow 2} \frac{3(2)^2 - 5(2) - 2}{(2)^2 - 4}$$

$$\lim_{x \rightarrow 2} \frac{3(4) - 10 - 2}{4 - 4}$$

$$\lim_{x \rightarrow 2} \frac{12 - 10 - 2}{0}$$

$$\lim_{x \rightarrow 2} \frac{0}{0} \quad \text{Indeterminación}$$

$$\lim_{x \rightarrow 2} \frac{3x^2 - 5x - 2}{x^2 - 4}$$

$$3x^2 - 5x - 2 = \frac{(3x-6)(3x+1)}{3} = (x-2)(3x+1)$$

$$\lim_{x \rightarrow 2} \frac{\cancel{(x-2)}(3x+1)}{\cancel{(x-2)}(x+2)}$$

$$\lim_{x \rightarrow 2} \frac{3(2)+1}{2+2}$$

$$\lim_{x \rightarrow 2} \frac{6+1}{4}$$

$$\lim_{x \rightarrow 2} \frac{7}{4}$$

$$20) \lim_{x \rightarrow \frac{2}{3}} \frac{9x^2 - 4}{3x - 2}$$

$$\lim_{x \rightarrow \frac{2}{3}} \frac{9\left(\frac{2}{3}\right)^2 - 4}{3\left(\frac{2}{3}\right) - 2}$$

$$\lim_{x \rightarrow \frac{2}{3}} \frac{9\left(\frac{4}{9}\right) - 4}{2 - 2}$$

$$\lim_{x \rightarrow \frac{2}{3}} \frac{4 - 4}{2 - 2}$$

$$\lim_{x \rightarrow \frac{2}{3}} \frac{0}{0} \quad \text{Indeterminado}$$

$$\lim_{x \rightarrow \frac{2}{3}} \frac{9x^2 - 4}{3x - 2}$$

$$9x^2 - 4 = (3x - 2)(3x + 2)$$

$$\begin{array}{cc} \downarrow & \downarrow \\ 3x & 2 \end{array}$$

$$\lim_{x \rightarrow \frac{2}{3}} \frac{(3x - 2)(3x + 2)}{3x - 2}$$

$$\lim_{x \rightarrow \frac{2}{3}} \frac{(3x - 2)(3x + 2)}{3x - 2}$$

$$\lim_{x \rightarrow \frac{2}{3}} (3x + 2)$$

$$\lim_{x \rightarrow \frac{2}{3}} 3\left(\frac{2}{3}\right) + 2$$

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

$$\lim_{x \rightarrow \frac{2}{3}} 4$$

$$21) \lim_{x \rightarrow -3} \frac{x^2 + 4x + 3}{x + 3}$$

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

$$\lim_{x \rightarrow -3} \frac{9 - 12 + 3}{-3 + 3}$$

$$\lim_{x \rightarrow -3} \frac{0}{0} \quad \text{Indeterminado}$$

$$22) \lim_{x \rightarrow 3} \frac{x^3 - 6x^2 + 9x}{x^2 - 9}$$

$$\lim_{x \rightarrow 3} \frac{(3)^3 - 6(3)^2 + 9(3)}{(3)^2 - 9}$$

$$\lim_{x \rightarrow 3} \frac{27 - 6(9) + 27}{9 - 9}$$

$$\lim_{x \rightarrow 3} \frac{27 - 54 + 27}{0}$$

$$\lim_{x \rightarrow 3} \frac{0}{0} \text{ Indeterminado}$$

$$\lim_{x \rightarrow 3} \frac{x^3 - 6x^2 + 9x}{x^2 - 9}$$

$$\textcircled{N} \frac{x^3 - 6x^2 + 9x}{x(x-3)^2} = \frac{x(x^2 - 6x + 3^2)}{\cancel{x} \cdot 2(x)(3)}$$

$$\textcircled{D} \frac{(x+3)(x-3)}{6x}$$

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

$$\lim_{x \rightarrow 3} \frac{3(0)}{6}$$

$$\lim_{x \rightarrow 3} \frac{0}{6}$$

$$\lim_{x \rightarrow 3} 0$$

$$23) \lim_{x \rightarrow 2} \frac{2x^2 - 3x - 2}{x^3 - 2x^2 - 3x + 6}$$

$$\lim_{x \rightarrow 2} \frac{2(2)^2 - 3(2) - 2}{(2)^3 - 2(2)^2 - 3(2) + 6}$$

$$\lim_{x \rightarrow 2} \frac{2(4) - 6 - 2}{8 - 4 - 6 + 6}$$

$$\lim_{x \rightarrow 2} \frac{8 - 6 - 2}{8 - 4 - 6 + 6}$$

$$\lim_{x \rightarrow 2} \frac{0}{0} \text{ Indeterminado}$$

$$\lim_{x \rightarrow 2} \frac{2x^2 - 3x - 2}{x^3 - 2x^2 - 3x + 6}$$

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

$$\frac{2(x-2)(2x+1)}{(x-2)(2x+1)}$$

$$\begin{aligned} & \textcircled{D} \frac{x^3 - 2x^2 - 3x + 6}{(x^3 - 2x^2) - (3x - 6)} \\ & \frac{x^2(x-2) - 3(x-2)}{(x-2)(x^2-3)} \end{aligned}$$

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

$$\frac{2x+1}{x^2-3}$$

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

$$\lim_{x \rightarrow 2} 5$$

$$24) \lim_{x \rightarrow 0} \frac{(x+3)^2 - 9}{x}$$

$$\lim_{x \rightarrow 0} \frac{(0+3)^2 - 9}{0}$$

$$\lim_{x \rightarrow 0} \frac{(3)^2 - 9}{0}$$

$$\lim_{x \rightarrow 0} \frac{9 - 9}{0}$$

$$\lim_{x \rightarrow 0} \frac{0}{0}$$

Indeterminado

$$\lim_{x \rightarrow 0} \frac{(x+3)^2 - 9}{x}$$

$$\lim_{x \rightarrow 0} \frac{x^2 + 6x + 9 - 9}{x}$$

$$\lim_{x \rightarrow 0} \frac{x^2 + 6x}{x}$$

$$\lim_{x \rightarrow 0} \cancel{x(x+6)}$$

$$\lim_{x \rightarrow 0} (x+6)$$

$$\lim_{x \rightarrow 0} 0+6$$

$$\lim_{x \rightarrow 0} 6$$

$$25) \lim_{x \rightarrow 0} \frac{(x+2)^3 - 8}{x}$$

$$\lim_{x \rightarrow 0} \frac{(0+2)^3 - 8}{0}$$

$$\lim_{x \rightarrow 0} \frac{(2)^3 - 8}{0}$$

$$\lim_{x \rightarrow 0} \frac{8 - 8}{0}$$

$$\lim_{x \rightarrow 0} \frac{0}{0} \quad \text{Indeterminación}$$

$$\lim_{x \rightarrow 0} \frac{(x+2)^3 - 8}{x}$$

$$\lim_{x \rightarrow 0} (a+b)^3 = a^3 + 3a^2b + 3ab^2 + b^3$$

$$\frac{x^3 + 6x^2 + 12x + 8 - 8}{x}$$

$$\lim_{x \rightarrow 0} \frac{x^3 + 6x^2 + 12x}{x}$$

$$\lim_{x \rightarrow 0} \cancel{x(x^2 + 6x + 12)}$$

$$\lim_{x \rightarrow 0} (x^2 + 6x + 12)$$

$$\lim_{x \rightarrow 0} 0^2 + 6(0) + 12$$

$$\lim_{x \rightarrow 0} 12$$