TAREA LIMITES

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Encuentre el límite indicado (si existe)

51) $\lim_{x\to 0} \frac{x}{x^2-x} = \frac{\lim_{x\to 0} x}{\lim_{x\to 0} x^2 - \lim_{x\to 0} x} = \frac{0}{0^2-0} = \frac{0}{0}$ = INDETERMINADO

$\lim_{x\to 0} \frac{x}{x(x-1)} = \lim_{x\to 0} \frac{1}{x-1} = \frac{\lim_{x\to 0} 1}{\lim_{x\to 0} x - \lim_{x\to 0} 1} = \frac{1}{0-1} = \frac{1}{-1} = -1$

52) $\lim_{x\to 0} \frac{3x}{x^2+2x} = \frac{3\lim_{x\to 0} x}{\lim_{x\to 0} x^2 + 2\lim_{x\to 0} x} = \frac{3(0)}{0^2+2(0)} = \frac{0}{0}$

INDETERMINADO

$\lim_{x\to 0} \frac{3x}{x^2+2x} = \lim_{x\to 0} \frac{3x}{x(x+2)} = \lim_{x\to 0} \frac{3}{x+2} = \frac{\lim_{x\to 0} 3}{\lim_{x\to 0} x + \lim_{x\to 0} 2}$

$= \frac{3}{0+2} = \frac{3}{2}$

53) $\lim_{x\to 4} \frac{x-4}{x^2-16} = \frac{\lim_{x\to 4} x - \lim_{x\to 4} 4}{\lim_{x\to 4} x^2 - \lim_{x\to 4} 16} = \frac{4-4}{16-16} = \frac{0}{0}$ INDETERMINADO

$\lim_{x\to 4} = \frac{1(x\neq 4)}{(x-4)(x+4)} = \frac{1}{(x+4)} = \lim_{x\to 4} 1 \Big/ \lim_{x\to 4} x + \lim_{x\to 4} 4 = \frac{1}{4+4} = \frac{1}{8}$

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54) $\lim_{x\to 3} \frac{3-x}{x^2-9} = \lim_{x\to 3} \frac{-1(x-3)}{(x+3)(x-3)} = \lim_{x\to 3} \frac{-1}{(x+3)}$

$= \lim_{x\to 3} -1 \Big/ \lim_{x\to 3} x + \lim_{x\to 3} 3 = -1/3+3 = -\frac{1}{6}$

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

$= \lim_{x\to -3} x - \lim_{x\to -3} 2 \Big/ \lim_{x\to -3} x - \lim_{x\to 3} 3 = \frac{-3-2}{-3-3} = \frac{-5}{-6} = \frac{5}{6}$

56) $\lim_{x\to 3} \frac{x^2-x-6}{x^2-5x+6} = \frac{3^2-3-6}{3^2-5(3)+6} = \frac{9-3-6}{9-15+6} = \frac{0}{0}$ INDETERMINADO

$\lim_{x\to 3} \frac{(x-3)(x+2)}{(x-3)(x-2)} = \lim_{x\to 3} \frac{(x+2)}{(x-2)} = \lim_{x\to 3} x + \lim_{x\to 3} 2 \Big/ \lim_{x\to 3} x - \lim_{x\to 3} 2$

$3+2 / 3-2 = 5/1 = 5$

57) $\lim_{x\to 4} \frac{\sqrt{x+5}-3}{x-4} = \sqrt{\lim_{x\to 4} x+5} - \lim_{x\to 4} 3 \Big/ \lim_{x\to 4} x - \lim_{x\to 4} 4$

$= \frac{4+5-3}{4-4} = \frac{\sqrt{9}-3}{0} = \frac{3-3}{0} = \frac{0}{0}$ = INDETERMINADO

$\lim_{x\to 4} \frac{\sqrt{x+5}-3}{x-4}\left(\frac{\sqrt{x+5}+3}{\sqrt{x+5}+3}\right) = \lim_{x\to 0} \frac{x+5-9}{x-4(\sqrt{x+5}+3)}$

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$= \frac{x-4}{x-4(\sqrt{x+5}+3)} = \frac{\lim_{x\to 4} 1}{\lim_{x\to 4}\sqrt{x+5}+\lim_{x\to 4} 3}$

$= 1/\sqrt{9}+3 = 1/3+3 = \underline{1/6}$

58) $\lim_{x\to 3} \frac{\sqrt{x+1}-2}{x-3}\left(\frac{\sqrt{x+1}+2}{\sqrt{x+1}+2}\right) = \lim_{x\to 3}\frac{x+1-4}{x-3(\sqrt{x+1}+2}$

$= \lim_{x\to 3}\frac{x-3}{x-3(\sqrt{x+1}+2} = \lim_{x\to 3} = \frac{1}{\sqrt{x+1}+2} = \lim_{x\to 3} 1 / \lim_{x\to 3}\sqrt{x+1}+\lim_{x\to 3} 2$

$= 1/\sqrt{3+1}+2 = 1/\sqrt{4}+2 = 1/2+2 = \underline{1/4}$

59) $\lim_{x\to 0}\frac{\sqrt{x+5}-\sqrt{5}}{x} = \frac{\sqrt{0+5}-\sqrt{5}}{0} = \frac{\sqrt{5}-\sqrt{5}}{0} = \frac{0}{0} =$ INDETERMINADO

$\lim_{x\to 0}\frac{\sqrt{x+5}-\sqrt{5}}{x}\left(\frac{\sqrt{x+5}+\sqrt{5}}{\sqrt{x+5}+\sqrt{5}}\right) = \lim_{x\to 0}\frac{x+5-5}{x(\sqrt{x+5}+\sqrt{5})} = \frac{x}{x(\sqrt{x+5}+\sqrt{5})}$

$= \lim_{x\to 0}\frac{1}{\sqrt{x+5}+\sqrt{5}} = \lim_{x\to 0} 1 / \lim_{x\to 0}\sqrt{x+5}+\sqrt{5} = \frac{1}{\sqrt{5}+\sqrt{5}} = \underline{\frac{1}{2\sqrt{5}}}$

60) $\lim_{x\to 0}\frac{\sqrt{3+x}-\sqrt{3}}{x} = \frac{\sqrt{3}-\sqrt{3}}{0} = \frac{0}{0} =$ Indeterminado

$\lim_{x\to 0}\frac{\sqrt{3+x}-\sqrt{3}}{x}\left(\frac{\sqrt{3+x}+\sqrt{3}}{\sqrt{3+x}+\sqrt{3}}\right) = \lim_{x\to 0}\frac{x+3-3}{x(\sqrt{3+x}+\sqrt{3})} = \frac{x}{x(\sqrt{3+x}\sqrt{3}} =$

$= \lim_{x\to 0}\frac{1}{\sqrt{3+x}+\sqrt{3}} = \lim_{x\to 0} 1 / \lim_{x\to 0}\sqrt{3+x}+\lim_{x\to 0}\sqrt{3}$

$= 1/\sqrt{3+0}+\sqrt{3} = \underline{1/2\sqrt{3}}$