Carlos Rumón Peña
(2022-1153)

En los ejercicios 1 a 8, completar la tabla y utilizar el resultado para estimar el límite. Representar la función utilizando una herramienta de graficación, con el fin de confirmar su resultado.

1. $\lim_{x \to 4} \frac{x-4}{x^2-3x-4} = \boxed{0}$

x	3.9	3.99	3.999	4.001	4.01	4.1
$f(x)$	-0,006	-0.0006	-0.00006	0.00006	0.0006	0.006

2. $\lim_{x \to 2} \frac{x-2}{x^2-4} = \boxed{0.25}$

x	1.9	1.99	1.999	2.001	2.01	2.1
$f(x)$	0.256	0.250	0.2500	0.2499	0.2493	0.2439

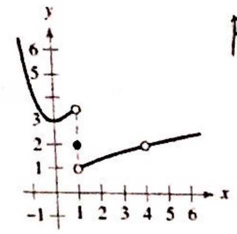
En los ejercicios 25 y 26, utilizar la gráfica de la función f para determinar si existe el valor de la cantidad dada. De ser así, ubicarla; si no existe, explicar por qué.

25. *a)* $f(1)$

b) $\lim_{x \to 1} f(x)$

c) $f(4)$

d) $\lim_{x \to 4} f(x)$



$F(1)$ = NO está definida

$\lim_{x \to 1} F(x)$ = NO existe

$F(4)$ = NO está definida

$\lim_{x \to 4} F(x) = 2$

26. *a)* $f(-2)$

b) $\lim_{x \to -2} f(x)$

c) $f(0)$ =

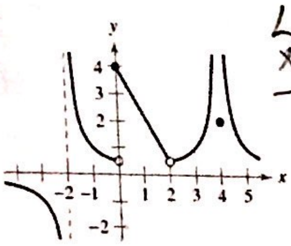
d) $\lim_{x \to 0} f(x)$

e) $f(2)$

f) $\lim_{x \to 2} f(x)$

g) $f(4)$

h) $\lim_{x \to 4} f(x)$



$F(-2)$ = NO existe.

$\lim_{x \to -2} F(x)$ = NO existe.

$F(0)$ = NO está definida.

$\lim_{x \to 0} F(0)$ = NO existe.

$F(2)$ = NO está definida.

$\lim_{x \to 2} F(x)$ = NO existe.

$F(4) = 2$

$\lim_{x \to 4} F(x)$ = NO existe

En los ejercicios 5 a 22, calcular el límite.

5. $\lim_{x \to 2} x^3 = F(2) = 2^3 = \boxed{8}$

6. $\lim_{x \to -2} x^4$

7. $\lim_{x \to 0} (2x - 1)$

8. $\lim_{x \to -3} (3x + 2)$

$F(0) = 2(0) - 1 = \boxed{-1}$

$F(-3) = 3(-3) + 2$

$= -9 + 2 = \boxed{-7}$

6. $\lim_{x \to -2} x^4$

$F(-2) = -2^4 = \boxed{16}$

49. $\lim_{x \to 0} \frac{x}{x^2 - x} = \frac{0}{0^2 - 0} = \frac{0}{0}$

$\lim_{x \to 0} \frac{x}{x^2 - x} = \lim_{x \to 0} \frac{\cancel{x}}{\cancel{x}(x-1)} = \lim_{x \to 0} \frac{1}{x-1} = \frac{1}{0-1} = \frac{1}{-1} = \boxed{-1}$

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

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

51. $\lim_{x \to 4} \frac{x-4}{x^2 - 16} = \frac{4-4}{4^2 - 16} = \frac{0}{0}$

$\lim_{x \to 4} \frac{x-4}{x^2 - 16} = \lim_{x \to 4} \frac{\cancel{x-4}}{\cancel{(x-4)}(x+4)} = \lim_{x \to 4} \frac{1}{x+4} = \frac{1}{4+4} = \boxed{\frac{1}{8}}$

$\downarrow \quad \downarrow$

$x \quad 4$

52. $\lim_{x \to 3} \frac{3-x}{x^2 - 9} = \frac{3-3}{3^2 - 9} = \frac{0}{0}$

$\lim_{x \to 3} \frac{3-x}{x^2 - 9} = \lim_{x \to 3} \frac{\cancel{3-x}}{\cancel{(x-3)}(x+3)} = \lim_{x \to 3} \frac{1}{x+3} = \frac{1}{3+3} = \boxed{\frac{1}{6}}$

$\downarrow \quad \downarrow$

$x \quad 3$

53. $\lim\limits_{x \to -3} \dfrac{x^2+x-6}{x^2-9} = \dfrac{-3^2+(-3)-6}{-3^2-9} = \dfrac{0}{0}$

$\lim\limits_{x \to -3} \dfrac{x^2+x-6}{x^2-9} = \lim\limits_{x \to -3} \dfrac{\cancel{(x+3)}(x-2)}{\cancel{(x+3)}(x-3)} = \lim\limits_{x \to -3} \dfrac{x-2}{x-3} =$

$= \dfrac{-3-2}{-3-3} = \dfrac{-5}{-6} = \boxed{\dfrac{5}{6}}$

54. $\lim\limits_{x \to 4} \dfrac{x^2-5x+4}{x^2-2x-8} = \dfrac{4^2-5(4)+4}{4^2-2(4)-8} = \dfrac{16-20+4}{16-8-8} = \dfrac{0}{0}$

$\lim\limits_{x \to 4} \dfrac{x^2-5x+4}{x^2-2x-8} = \lim\limits_{x \to 4} \dfrac{\cancel{(x-4)}(x-1)}{\cancel{(x-4)}(x+2)} = \lim\limits_{x \to 4} \dfrac{x-1}{x+2} = \dfrac{4-1}{4+2} = \boxed{\dfrac{3}{6}}$

55. $\lim\limits_{x \to 4} \dfrac{\sqrt{x+5}-3}{x-4} = \dfrac{\sqrt{4+5}-3}{4-4} = \dfrac{\sqrt{9}-3}{0} = \dfrac{3-3}{0}\ \dfrac{0}{0}$

$\lim\limits_{x \to 4} \dfrac{\sqrt{x+5}-3}{x-4} \cdot \dfrac{\sqrt{x+5}+3}{\sqrt{x+5}+3} = \lim\limits_{x \to 4} \dfrac{(\sqrt{x+5})^2-3^2}{(x-4)(\sqrt{x+5}+3)} = \lim\limits_{x \to 4} \dfrac{x+5-9}{(x-4)(\sqrt{x+5}+3)}$

$= \lim\limits_{x \to 4} \dfrac{\cancel{x-4}}{\cancel{(x-4)}(\sqrt{x+5}+3)} = \lim\limits_{x \to 4} \dfrac{1}{\sqrt{4+5}+3} = \dfrac{1}{3+3} = \boxed{\dfrac{1}{6}}$

57.

57. $\lim\limits_{x \to 0} \dfrac{\sqrt{x+5}-\sqrt{5}}{x} = \dfrac{\sqrt{0+5}-\sqrt{5}}{0} = \dfrac{0}{0}$

$\lim\limits_{x \to 0} \dfrac{\sqrt{x+5}-\sqrt{5}}{x} \cdot \dfrac{\sqrt{x+5}+\sqrt{5}}{\sqrt{x+5}+\sqrt{5}} = \lim\limits_{x \to 0} \dfrac{(\cancel{\sqrt{x+5}})^{\cancel{2}} + (\cancel{\sqrt{5}})^{\cancel{2}}}{x(\sqrt{x+5}+\sqrt{5})} =$

$= \lim\limits_{x \to 0} \dfrac{x+5-5}{x(\sqrt{x+5}+\sqrt{5})} = \lim\limits_{x \to 0} \dfrac{\cancel{x}}{\cancel{x}(\sqrt{x+5}+\sqrt{5})} = \dfrac{1}{\sqrt{x+5}+\sqrt{5}}$

$= \dfrac{1}{\sqrt{0+5}+\sqrt{5}} = \dfrac{1}{\sqrt{5}+\sqrt{5}} = \boxed{\dfrac{1}{2\sqrt{5}}}$