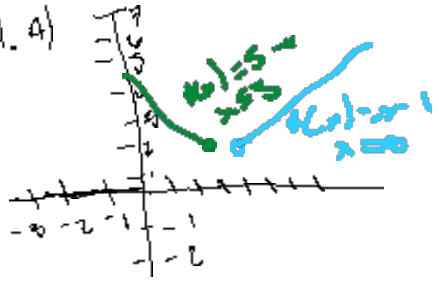
5c. The function represented by the graph is discontinuous

6c. The function represented by the graph is discontinuous

64.a) 

64.b) $\lim_{x \to 3^-} f(x) = \lim_{x \to 3^-}(5) = 5 - 3 = 2$

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

64.b) yes

68. $f(x) = \frac{x^2}{(x+3)(x-2)}$ is continuous at all x-values except $x = -3$ & $x = 2$

74. The function is discontinuous at $x = -4$ or $\lim_{x \to -4} f(x)$ doesn't exist

7c. The function $f(x) = \frac{|x|}{x}$ is dis. at $x = 0$

80. $\lim_{x \to 3^-} \sqrt{1 - \left(\frac{x}{3}\right)^2} = \sqrt{1 - \left(\frac{3}{3}\right)^2} = \sqrt{1-1} = 0$

2.1 Exercises

4. $\lim_{x\to 1}\left(\frac{x^4-1}{x-1}\right)$

$(x^2+1)(x+1)$

$(1^2+1)(1+1)=4$

8. $\lim_{x\to -1}$ =

x	f(x)
0.90	0.9381
0.99	0.9802
0.9990	0.9980
0.9999	0.9998
0.99990	0.99990

≈ 0.5000

12. $\lim_{x\to 1}\frac{x-1}{x\sqrt{x}-1}$ =

$\frac{(\sqrt{x}-1)(\sqrt{x}+1)}{\sqrt{x}(\sqrt{x}-1)} = \left(\frac{\sqrt{x}-1}{\sqrt{x}}\right)$

$\frac{\sqrt{1}+1}{\sqrt{1}} = 2$

16. $\lim_{t\to 3}\sqrt{t^2+t+-4}$

$\sqrt{3^2+3-4} = 2$

20. $\lim_{x\to 1}\left(x^{3/2}-3x^{1/2}\right)$

$(1^{3/2}-3(1)^{1/2})$

$(1-3)(1)^{1/2}$ $1(2)^{\frac{1}{2}} = 2$

24. $\lim_{x\to 2}\frac{x-1}{\sqrt{x+2}-2}$

$\left(\frac{x-1}{x^2+2x-2-2}\right) = \left(\frac{x-1}{x(x+2)(x+2)}\right) =$

$\left(\frac{x-1}{x+2(x-1)}\right) = \left(\frac{1}{x+2}\right) = \frac{1}{2+2} = \frac{1}{5}$

28. $\lim_{x\to 0}\frac{x^2-x}{x^2+x}$

$\left(\frac{x(x-1)}{x(x+1)}\right) = \left(\frac{x-1}{x+1}\right)$

$\frac{0-1}{0+1} = -1$

32. $\lim_{h\to 0}\frac{x^2+2hx+h^2-x^2}{h}$ =

$\lim_{h\to 0}(2x+h) = x^2-x(0+0)$

$= x^2$

36. a) $\lim_{x\to 2^-} f(x) = 3$

as $x\to 2$ from left, $f(x)$ tends 3

b) $\lim_{x\to 2^+} f(x) = 3$

as $x\to 2$ from right, $f(x)$ tends 3

c) $\lim_{x\to 2} f(x) = 3$

since both $\lim_{x\to 2^-} f(x) = \lim_{x\to 2^+} f(x) = 3$

40. a) $f(x) = \begin{cases} 2-x^2, & x<4 \\ 2x-10, & x\geq 4 \end{cases}$

$\lim_{x\to 4} f(x) = \lim_{x\to 4}(2-x^2)$

$= \lim_{h\to 0}[2-(4-h)^2]$

$= \lim_{h\to 0}[2-(16-8h+h^2)]$

$= \lim_{h\to 0}[-14+8h-h^2]$

$= -14$

b) $\lim_{x\to 4^+} f(x) = \lim_{x\to 4^+}(2x-10)$

$= \lim_{h\to 0}[2(4+h)-10]$

$= \lim_{h\to 0}[8+2h-10]$

$= \lim_{h\to 0}[2h-2]$

$= -2$

c) $f(4) = -2\times 4+10 = -2$

$\lim_{x\to 4^-} f(x) = \lim_{x\to 4^+} f(x) = -2$

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

44. $\lim_{x\to 1}$ $f(x) = \infty$

x does not exist

48. $\lim_{x\to 0}$ $f(x) = \infty$

x does not exist

52. exists if $\lim_{x\to 1} f(x) = \infty$

54.

a) $\lim_{x\to 0} = \frac{|x|}{x} = \left(\frac{-x}{x}\right)\left(\frac{x}{x}\right) = -1$

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

$\lim_{x\to 0} = \frac{|x|}{x}$ = Doesn't exist