James Ding

AP Calc AB: HW 1.5B

22. Let $f(h) = \frac{(2+h)^5 - 32}{h}$

x	$f(x)$
-0.5	48.8125
-0.1	72.3901
-0.01	79.20399
-0.001	79.92004
-0.0001	79.992
0.0001	80.008
0.001	80.08004
0.01	80.80401
0.1	88.4101
0.5	131.3125

) Most likely approaches 80 when $x=0$

$\lim_{h\to 0} \frac{(2+h)^5 - 32}{h} = \boxed{80}$

30. $\lim_{x\to 5^-} \frac{x+1}{x-5}$

$= \frac{5^- + 1}{5^- - 5}$

$= \frac{6}{0^-}$

$\boxed{= -\infty}$

32. $\lim_{x\to 3^-} \frac{\sqrt{x}}{(x-3)^5}$

$= \frac{\sqrt{3^-}}{(0^-)^5}$

$= \frac{\sqrt{3}}{0^-}$

$\boxed{= -\infty}$

34. $\lim_{x\to 0} \frac{x-1}{x^2(x+2)}$

$\lim_{x\to 0^-} \frac{x-1}{x^2(x+2)}$

$= \frac{0^- - 1}{(0^-)^2(0^- + 2)}$

$= \frac{-1}{0^+(2)}$

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

$= -\infty$

$\lim_{x\to 0^+} \frac{x-1}{x^2(x+2)}$

$= \frac{0^+ - 1}{(0^+)^2(0^+ + 2)}$

$= \frac{-1}{0^+(2)}$

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

$= -\infty$

$\boxed{-\infty}$

36. $\lim_{x\to \pi^-} \cot x$

$= \lim_{x\to \pi^-} \frac{1}{\tan x}$

$= \frac{1}{\tan \pi^-}$

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

$\boxed{= -\infty}$

38. $\lim_{x\to 2^-} \frac{x^2 - 2x}{x^2 - 4x + 4}$

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

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

$= \frac{2^-}{2^- - 2}$

$= \frac{2}{0^-}$

$\boxed{= -\infty}$

44. a.

x	$h(x)$
1	0.5574
0.5	0.3704
0.1	0.3346
0.05	0.33336
0.01	0.3333
0.005	0.3333

b. $\frac{1}{3}$

48. $\lim_{v\to c^-} \frac{m_0}{\sqrt{1 - v^2/c^2}}$

$= \frac{m_0}{\sqrt{1 - \frac{(c^-)^2}{c^2}}}$

$= \frac{m_0}{\sqrt{1 - 1^-}}$

$= \frac{m_0}{\sqrt{0^+}}$

$= \frac{m_0}{0^+}$

$\boxed{= \infty}$