James D 7

AP Calc 6.8

10. $\lim_{x\to -2} \frac{x^3+8}{x+2}$

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

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

$= 12$; Doesn't apply as factoring is faster

15. $\lim_{t\to 0} \frac{e^{2t}-1}{\sin t} \Rightarrow \frac{0}{0}$

$\overset{LH}{=} \lim_{t\to 0} \frac{2e^{2t}}{\cos t}$

$= 2$

20. $\lim_{x\to\infty} \frac{x+x^2}{1-2x^2}$

$= \lim_{x\to\infty} \frac{1/x+1}{1/x^2-2}$

$= -\frac{1}{2}$; ~~Infinite Limit~~ has faster shortcut

25. $\lim_{x\to 0} \frac{\sqrt{1+2x}-\sqrt{1-4x}}{x}$

$= \lim_{x\to 0} \frac{1+2x-(1-4x)}{x} \cdot \frac{1}{\sqrt{1+2x}+\sqrt{1-4x}}$

$= \lim_{x\to 0} \frac{6x}{x(\sqrt{1+2x}+\sqrt{1-4x})}$

$= \lim_{x\to 0} \frac{6}{\sqrt{1+2x}+\sqrt{1-4x}}$

$= 3$; Derivative would be too complicated to find

30. $\lim_{x\to 0} \frac{x-\sin x}{x-\tan x} \Rightarrow \frac{0}{0}$

$\overset{LH}{=} \lim_{x\to 0} \frac{1-\cos x}{1-\sec^2 x} \Rightarrow \frac{0}{0}$

$\overset{LH}{=} \lim_{x\to 0} \frac{\sin x}{-2\sec^2 x \tan x}$

$= \lim_{x\to 0} \frac{\cos^3 x}{-2}$

$= -\frac{1}{2}$

35. $\lim_{x\to 0} \frac{\ln(1+x)}{\cos x + e^x - 1}$

$= \frac{0}{1}$

$= 0$

40. $\lim_{x\to 0} \frac{e^x - e^{-x} - 2x}{x - \sin x} \Rightarrow \frac{0}{0}$

~~$\lim_{x\to 0} \frac{e^x + e^{-x} - 2}{1-\cos x}$~~

$\overset{LH}{=} \lim_{x\to 0} \frac{e^x + e^{-x} - 2}{1-\cos x} \Rightarrow \frac{0}{0}$

$\overset{LH}{=} \lim_{x\to 0} \frac{e^x - e^{-x}}{\sin x} \Rightarrow \frac{0}{0}$

$\overset{LH}{=} \lim_{x\to 0} \frac{e^x + e^{-x}}{\cos x}$

$= 2$

45. $\lim_{x\to 0} \sin 5x \cdot \csc 3x$

$= \lim_{x\to 0} \frac{\sin 5x}{\sin 3x} \Rightarrow \frac{0}{0}$

$\overset{LH}{=} \lim_{x\to 0} \frac{\cos 5x \cdot 5}{\cos 3x \cdot 3}$

$= \frac{5}{3}$

50. $\lim_{x\to \frac{\pi}{2}^-} \cos x \cdot \sec 5x$

$= \lim_{x\to \frac{\pi}{2}^-} \frac{\cos x}{\cos 5x} \Rightarrow \frac{0}{0}$

$= \lim_{x\to \frac{\pi}{2}^-} \frac{-\sin x}{-\sin 5x \cdot 5}$

$= \frac{1}{5}$