1.
$$\lim_{x\to 0} \frac{3x^2}{\cos(x)-1} = \lim_{x\to 0} \frac{6x}{-\sin(x)} = \lim_{x\to 0} \frac{6}{-\cos(x)} = \frac{6}{-\cos(x)} = \frac{6}{-\cos(x)}$$



$$2. \lim_{x \to \infty} x \sin\left(\frac{4}{3x}\right) = \lim_{x \to \infty} \frac{\sin\left(\frac{4}{3x}\right)}{\frac{1}{x}} = \lim_{x \to \infty} \frac{\cos\left(\frac{4}{3x}\right)\left(-\frac{4}{3x^2}\right)}{\frac{-1}{x^2}}$$

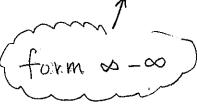
3.
$$\lim_{x \to \infty} \frac{2x^2 + 7e^x}{x^2 + x + 4e^x - 1} = \lim_{x \to \infty} \frac{4x + 7e^x}{2x + 1 + 4e^x} = \lim_{x \to \infty} \frac{4 + 7e^x}{2 + 4e^x} = \lim_{x \to \infty} \frac{7e^x}{4e^x}$$

$$=\lim_{x\to\infty}\frac{4+7e^{x}}{2+4e^{x}}=\lim_{x\to\infty}\frac{7e^{x}}{4e^{x}}$$



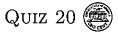
$$=\left(\frac{7}{4}\right)$$

4.
$$\lim_{x\to 0} (\ln|x| - \ln|\sin(x)|) = \lim_{x\to 0} \ln\left|\frac{x}{\sin(x)}\right| = \ln\left|\lim_{x\to 0} \frac{x}{\sin(x)}\right|$$



$$\begin{aligned}
& = \lim_{x \to 0} \frac{1}{\cos(x)} \\
& = \lim_{x \to 0} \frac{$$

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

 $\lim_{x \to 1} \frac{4 + 2\ln|x - 1|}{x - 3\ln|1 - x|} = \lim_{x \to 1} \frac{\frac{2}{x - 1}}{\frac{-3}{1 - x}} = \lim_{x \to 1} \frac{\frac{2}{(x - 1)^2}}{\frac{3(-1)}{(1 - x)^2}} = \lim_{x \to 1} \frac{2}{3(x - 1)^2}$

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

 $\int_{-\infty}^{\infty} \frac{e^{\frac{1}{x}(\frac{1}{x^2})}}{e^{\frac{1}{x^2}}} = \lim_{x \to \infty} e^{\frac{1}{x}}$

 $= \lim_{x \to 0} \frac{z}{\sec^2(x)} = \frac{z}{\sec^2(0)} = \frac{z}{1}$