1. Evaluate the following limits.

[Do not use L'Hôpital's Rule!]

a. $\lim_{x \to 1} \frac{2x^3 - 3x^2 + 1}{x^3 - 3x + 2} = \lim_{x \to 1} \frac{(x-1)\cdot(2x^2-x-1)}{(x-1)\cdot(x^2+x-2)}$

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

b. $\lim_{x \to 0^-} \frac{\sqrt{\cos(x) - \cos(2x)}}{x}$

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

$= \lim_{x \to 0} \frac{2\sin^2(\frac{x}{2})}{x^2} \cdot \lim_{x \to 0} (1+2\cos x) = \frac{1}{2}\cdot\left(\lim_{x \to 0} \frac{\sin(\frac{x}{2})}{\frac{x}{2}}\right)^2 \cdot (1+2\cdot 1) = \frac{1}{2}\cdot 1^2 \cdot 3 = \frac{3}{2}$

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