Solve the following two problems, showing all your work. Do not use theorems that haven't been covered in this class yet (such as L'Hôpital's rule).

(1) Determine whether the limit exists. If it does, compute its value:

$$\lim_{x \to 0} \frac{x \cdot \cos(x)}{x - 2\sin(x)}$$

(2) Determine whether the limit exists. If it does, compute its value:

$$\lim_{x \to \infty} \frac{x + \cos(x^2)}{x^2 + \cos(x)}$$