Calculus A(1): Exercise 2

1. Evaluate the limit as follows.

   a. $\lim_{x\to+\infty} \dfrac{\sin x}{x}$ **b.** $\lim_{x\to 3} \dfrac{x^2-x-6}{x-3}$

   c. $\lim_{x\to\pi} \dfrac{\sin x - \sin\pi}{x-\pi}$ **d.** $\lim_{x\to+\infty} \dfrac{12x^3-3x-6}{x^4+x^2+1}$

2. Evaluate the limits as follows.

   a. $\lim_{x\to 0} \dfrac{1-\cos x}{x^2}$

   b. $\lim_{x\to 0} \dfrac{1-\cos x\cos 2x\cos 3x\cdots\cos nx}{x^2}$ (Hint: Use the result of **a.)**

3. Evaluate the limit : $\lim_{x\to+\infty}(\sqrt[3]{(x+1)(x+2)(x+3)}-x)$.

4. Evaluate the limits as follows.

   a. $\lim_{x\to 1}(\dfrac{2}{1-x^2}-\dfrac{3}{1-x^3})$

   b. $\lim_{x\to 1}(\dfrac{m}{1-x^m}-\dfrac{n}{1-x^n})$, where m, n are positive integers.