1. Find the limit

   (i). $\lim\limits_{x \to \infty} 2^{-x^2}$

   (ii). $\lim\limits_{x \to \infty} \dfrac{e^{3x} - e^{-3x}}{e^{3x} + e^{-3x}}$

   (iii). $\lim\limits_{x \to 3^+} \log_{\frac{1}{2}}(x^2 - 9)$

   (iv). $\lim\limits_{x \to \infty} \left[\ln(1 + x^2) - \ln(1 + x) \right]$

2. Prove that $f(x) = \dfrac{1 - e^{\frac{1}{x}}}{1 + e^{\frac{1}{x}}}$ is an odd function.

3. Find the inverse function of $f(x) = \dfrac{4x-1}{2x+3}$

4. If $f(x) = x^5 + x^3 + x$, find $(f^{-1})'(3)$

5. Compute the value of $2\log_3 10 - \log_3 18 - \log_3 50$

6. Differentiate the following functions:

   (i). $f(x) = 10^{1-x^2}$

   (ii). $f(x) = x^2 e^{-\frac{1}{x}}$

   (iii). $f(x) = \ln(\ln x)$

   (iv). $f(x) = \log_2(\sin x^2)$