

※ 考生請注意：本試題不可使用計算機

每題10分，總分100分

1.  $\lim_{x \rightarrow 2} \frac{3x^2 - x - 10}{x^2 - 4}$

2.  $\lim_{x \rightarrow \infty} \frac{2 - \cos x}{x + 3}$

3. Compute the derivatives of  $f(x)$ , where  $f(x) = \sqrt{x^3 - x}$

4. Compute the derivatives of  $f(x)$ , where  $f(x) = \frac{\cos x}{1 + \sin x}$

5. Evaluate  $\sum_{i=1}^{200} (i - 3)^2$

6. Evaluate  $\int_{-2}^1 (3x^2 + 2) dx$

7. Integrate  $\int (2 - 3e^x) dx$

8. Integrate  $\int x \cos 3x dx$

9. Integrate  $\int \frac{2x + 3}{x^2 - 9} dx$

10. Give the Taylor series of  $f(x) = \sin x$  near  $x=0$