Note: Please draw a table and write down your answers without any calculations in all problems.

Part I: True-False Questions

1. Let $a_n = 1/n$, $n = 1, 2, \ldots$. Then $\{a_n\}$ is a bounded sequence. (6 pts.)
2. Given a sequence $\{a_n\}$, suppose that for every $\varepsilon > 0$, there is an integer n_ε such that $|a_n - a_o| < \varepsilon$ whenever $n > n_\varepsilon$. Then $\lim_{n\to\infty} a_n = a_o$. (6 pts.)
3. A convergent sequence is also a Cauchy sequence. (6 pts.)
4. A differentiable function is not necessarily a continuous function. (6 pts.)
5. Let f be a differentiable function. Then its derivative is a continuous function. (6 pts.)
6. Let $F(x) = \int_c^x f(t)\,\mathrm{d}t$. Then F is a continuous function. (6 pts.)

Part II: Fill in the Blank Questions

7. $\lim_{x\to 1} \frac{x-1}{\sqrt{x}-1} =$ _____. (8 pts.)
8. $\int_0^\infty \frac{(x-a)^4}{a} e^{-x/a}\,\mathrm{d}x =$ _____. (8 pts.)
9. Let $2y + 4x^2 = x^2y + y^4$. Then $\mathrm{d}y/\,\mathrm{d}x =$ _____. (8 pts.)
10. Let $f(x) = \frac{e^x}{1+e^x}$. Then $f'(x) =$ _____. (8 pts.)
11. $\int_{-\infty}^\infty (x-2)^4 e^{-\pi(x-2)^2}\,\mathrm{d}x =$ _____. (8 pts.)
12. $\lim_{x\to 0} \frac{\sin x}{x} =$ _____. (8 pts.)
13. $\int_0^1 \cdots \int_0^1 e^{\sum_{i=1}^n x_i}\,\mathrm{d}x_1 \cdots \mathrm{d}x_n =$ _____. (8 pts.)
14. Let $f(x) = x^3 + 3x^2 - 4x - 5$. Then $\max_{-4\le x\le 0} f(x) =$ _____. (8 pts.)