Name _____

Period _____

Calculus BC – Chapter 7 Sample Test (no calculators)

Show all work for free-response questions.

1. What are all values of p for which $\int_1^\infty \frac{1}{x^{2p}}dx$ converges?

(A) $p < \frac{1}{2}$ (B) $p > 0$ (C) $p > \frac{1}{2}$

(D) $p > 1$ (E) There are no values of p

2. $\int \frac{2x}{(x+2)(x+1)}dx =$

(A) $\ln|x+2| + \ln|x+1| + C$

(B) $\ln|x+2| + \ln|x+1| - 3x + C$

(C) $-4\ln|x+2| + 2\ln|x+1| + C$

(D) $4\ln|x+2| - 2\ln|x+1| + C$

(E) $2\ln|x| + \frac{2}{3}x + \frac{1}{2}x^2 + C$

3. $\int_0^\infty x^2 e^{-x^3}dx$ is

(A) $-\frac{1}{3}$ (B) 0 (C) $\frac{1}{3}$

(D) 1 (E) divergent

4. $\int \frac{dx}{(x-1)(x+3)} =$

(A) $\frac{1}{4}\ln\left|\frac{x-1}{x+3}\right| + C$

(B) $\frac{1}{4}\ln\left|\frac{x+3}{x-1}\right| + C$

(C) $\frac{1}{2}\ln|(x-1)(x+3)| + C$

(D) $\frac{1}{2}\ln\left|\frac{2x+2}{(x-1)(x+3)}\right| + C$

(E) $\ln|(x-1)(x+3)| + C$

5. $\int \frac{x}{x^2-4}\,dx =$

(A) $\frac{-1}{4(x^2-4)^2} + C$ (B) $\frac{1}{2(x^2-4)} + C$ (C) $\frac{1}{2}\ln|x^2-4| + C$

(D) $2\ln|x^2-4| + C$ (E) $\frac{1}{2}\tan^{-1}\left(\frac{x}{2}\right) + C$

6. $\int \sec^5 x \tan^3 x \, dx =$

(A) $\frac{1}{7}\sec^7 x - \frac{1}{5}\sec^5 x + C$

(B) $\frac{1}{24}\sec^6 x \tan^4 x + C$

(C) $\frac{1}{4}\sec^4 x \tan x + C$

(D) $\frac{1}{8}\sec^8 x - \frac{1}{6}\sec^6 x + C$

(E) $\frac{1}{5}\sec^5 x - \frac{1}{7}\sec^7 x + C$

7. $\int \frac{3x^3-17x^2+36x-35}{x^2-4x+4} dx =$

8. $\int \frac{\sqrt{9-x^2}}{x} dx =$

9. $\int \tan^4 x \sec^4 x \, dx =$

10. $\int \sqrt{9 - 4x^2} dx =$

11. $\int \sin^5 t \, dt =$

12. $\int \frac{x^3}{\sqrt{4+x^2}} dx =$

13. $\int x^3 \ln x \, dx$

14. $\int \frac{x^2}{x+5} dx$

15. $\int \frac{10x+1}{(2x-1)(x+1)} dx$