AP Calculus Homework 13

Please write your answer on a separate piece of paper and submit it on Classkick or write your answer directly on Classkick.

Please write all answers in exact forms. For example, write π instead of 3.14.

Questions with a * are optional. Questions with ** are optional and more challenging.

1. Evaluate the integral.

a)* $\int_3^4 \frac{x^3-2x^2-4}{x^3-2x^2}dx$ b) $\int \frac{1}{(x+5)^2(x-1)}dx$ c) $\int \frac{x^3+4}{x^2+4}dx$

d) $\int \frac{x^2-x+6}{x^3+3x}dx$ e)** $\int \frac{1}{x^3-1}dx$

2. Determine whether each integral is convergent or divergent. Evaluate those that are convergent.

a) $\int_1^\infty \frac{1}{(3x+1)^2}dx$ b) $\int_{-\infty}^0 \frac{1}{2x-5}dx$ c) $\int_{-\infty}^{-1} \frac{1}{\sqrt{2-w}}dw$

d) $\int_{-\infty}^\infty \frac{x}{1+x^2}dx$ e)* $\int_{-\infty}^\infty xe^{-x^2}dx$ f) $\int_{2\pi}^\infty \sin\theta d\theta$ g) $\int_1^\infty \frac{\ln x}{x}dx$

3. $\int_2^\infty \frac{1}{x^2}dx$ is

(A) $\frac{1}{2}$ (B) $\ln 2$ (C) 1 (D) 2 (E) nonexistent

4. $\int_1^\infty \frac{x}{(1+x^2)^2}dx$ is

(A) $-\frac{1}{2}$ (B) $-\frac{1}{4}$ (C) $\frac{1}{4}$ (D) $\frac{1}{2}$ (E) divergent

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

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