AP Calculus Homework 12

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)* $\int \frac{\sin^3\sqrt{x}}{\sqrt{x}}dx$ b) $\int x\cos^2 x dx$ c)* $\int \cos^2 x\tan^3 x dx$

d) $\int \cos^2 x\sin 2x dx$ e) $\int \tan^2 x dx$ f)* $\int_0^{\pi/3} \tan^5 x\sec^4 x dx$

g) $\int x\sec x\tan x dx$

2. A particle moves on a straight line with velocity function $v(t) = \sin\omega t\cos^2\omega t$. Find its position function $s = f(t)$ if $f(0) = 0$.

3. Evaluate the integral.

a) $\int \frac{x-9}{x^2+3x-10}dx$ b) $\int \frac{1}{t^2+3t-4}dt$ c)* $\int_0^1 \frac{x-1}{x^2+3x+2}dx$

4. $\int \frac{1}{x^2-6x+8}dx =$

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

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

5. $\int_2^3 \frac{3}{(x-1)(x+2)}dx =$

(A) $-\frac{33}{20}$ (B) $-\frac{9}{20}$ (C) $\ln\left(\frac{5}{2}\right)$ (D) $\ln\left(\frac{8}{5}\right)$ (E) $\ln\left(\frac{2}{5}\right)$