# Homework 21

The **due date** for this homework is **Tue 7 May 2013 12:00 AM EDT**.

## Question 1

$$\int 3\cos x\,dx =$$

- $\sin 3x + C$
- $-3\sin x + C$
- $3\cos x + C$
- $\cos 3x + C$
- $-3\cos x + C$
- $3\sin x + C$

## Question 2

$$\int x\sec^2 x^2\,dx =$$

- $\frac{1}{2}x\sec^2 x^2 + C$
- $x^2\tan x^2 + C$
- $\tan x^2 + C$
- $\frac{1}{2}\tan x^2 + C$
- $2\sec x^2 + C$
- $\frac{1}{2}x\tan^2 x^2 + C$

# Question 3

$$\int \frac{4x}{(x^2-1)^3}\,dx =$$

- $-\dfrac{1}{(x^2-1)^2}+C$
- $-\dfrac{2x}{(x^2-1)^2}+C$
- $\dfrac{2}{3(x^2-1)^2}+C$
- $\dfrac{1}{(x^2-1)^2}+C$
- $\dfrac{4}{3(x^2-1)^2}+C$
- $-\dfrac{2}{3(x^2-1)^2}+C$

# Question 4

$$\int \frac{e^{\sqrt{x}}}{\sqrt{x}}\,dx =$$

- $e^{\sqrt{x}}+C$
- $e^{2\sqrt{x}}+C$
- $e^{\sqrt{x}/2}+C$
- $2\sqrt{x}\,e^{\sqrt{x}}+C$
- $\dfrac{1}{2}\sqrt{x}\,e^{\sqrt{x}}+C$
- $2e^{\sqrt{x}}+C$

# Question 5

$$\int \frac{\ln(15x^5)}{x}\ dx =$$

- $\frac{5}{2}\, x^6 + C$
- $\frac{5}{2}\, \ln(15x) + C$
- $\frac{1}{10}\, \ln^2(15x^5) + C$
- $10\,\ln^2(15x) + C$
- $\frac{1}{10}\, \ln(15x) + C$
- $\frac{1}{60}\, \ln^2(15x^5) + C$

# Question 6

$$\int \frac{x\,dx}{\sqrt{x+3}} =$$

- $\frac{2}{3}\,(x-6)\sqrt{x+3} + C$
- $\frac{1}{3}\,(x-3)\sqrt{x+3} + C$
- $\frac{1}{3}\left[(x+3)^{3/2} - 2(x+3)^{1/2}\right] + C$
- $\frac{1}{3}\,(x+6)\sqrt{x+3} + C$
- $\frac{2}{3}\left[2(x+3)^{3/2} + (x+3)^{1/2}\right] + C$
- $\frac{2}{3}\,(x+3)^{3/2} + C$

# Question 7

Apply the substitution $u = \dfrac{1}{x}$ to calculate the integral $I(x) = \displaystyle\int \frac{dx}{x\sqrt{x^2-1}}$ assuming $x > 0$.

- $I(x) = 2\sqrt{x^2-1} + C$
- $I(x) = \arctan\dfrac{1}{x} + C$
- $I(x) = -2\sqrt{x^2-1} + C$
- $I(x) = -\arcsin\dfrac{1}{x} + C$
- $I(x) = \arcsin\dfrac{1}{x} + C$
- $I(x) = -\arctan\dfrac{1}{x} + C$

# Question 8

Apply the substitution $u = \sqrt{x^2-1}$ to calculate the integral $I(x) = \displaystyle\int \frac{dx}{x\sqrt{x^2-1}}$.

Note: observe that this is exactly the same integral as that of the previous problem. In Lecture 23, we will learn of yet another substitution that allows us to solve this integral.

- $I(x) = -\arcsin\dfrac{1}{\sqrt{x^2-1}} + C$
- $I(x) = \arctan\sqrt{x^2-1} + C$
- $I(x) = -2\sqrt{x^2-1} + C$
- $I(x) = -\arctan\sqrt{x^2-1} + C$

- $I(x) = \arcsin \dfrac{1}{\sqrt{x^2-1}} + C$
- $I(x) = 2\sqrt{x^2-1} + C$

☐ In accordance with the Honor Code, I certify that my answers here are my own work.

Submit Answers Save Answers