

Homework 22

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

Question 1

$$\int x^2 e^{x/2} dx =$$

- ☐ $e^{x/2}(x^2 - 2x + 4) + C$
- ☐ $2e^{x/2}(x^2 - 4x - 8) + C$
- ☐ $2e^{x/2}(x - 2) + C$
- ☐ $e^{x/2}\left(\frac{1}{2}x^2 - \frac{1}{8}x + \frac{1}{16}\right) + C$
- ☐ $2e^{x/2}(x^2 - 4x + 8) + C$
- ☐ $e^{x/2}(x^2 - 4x - 8) + C$

Question 2

$$\int 3x^2 \ln x dx =$$

- ☐ $3x^2 \ln x + \frac{1}{4}x^4 + C$
- ☐ $3x^2 \ln x - \frac{1}{4}x^4 + C$
- ☐ $x(\ln x - 1) + C$
- ☐ $x^2\left(\ln x - \frac{1}{2}\right) + C$
- ☐ $x^3\left(\ln x - \frac{1}{3}\right) + C$

☐ $\frac{1}{3} x^3 (\ln x - 1) + C$

Question 3

$$\int x^2 \cos \frac{x}{2} dx =$$

Hint: no mathematician ever remembers those reductions formulas in the Lecture, but we all remember that we get to them by repeated integration by parts.

- ☐ $(16 - 2x^2) \sin \frac{x}{2} - 8x \cos \frac{x}{2} + C$
- ☐ $(2x^2 + 16) \sin \frac{x}{2} - 8x \cos \frac{x}{2} + C$
- ☐ $(2x^2 + 16) \sin \frac{x}{2} + 8x \cos \frac{x}{2} + C$
- ☐ $(16 - 2x^2) \sin \frac{x}{2} + 8x \cos \frac{x}{2} + C$
- ☐ $(2x^2 - 16) \sin \frac{x}{2} + 8x \cos \frac{x}{2} + C$
- ☐ $(2x^2 - 16) \sin \frac{x}{2} - 8x \cos \frac{x}{2} + C$

Question 4

$$\int e^{2x} \sin 3x dx =$$

- ☐ $\frac{2}{3} e^{2x} \cos 3x + \frac{3}{13} e^{2x} \sin 3x + C$
- ☐ $\frac{2}{13} e^{2x} \cos 3x - \frac{3}{13} e^{2x} \sin 3x + C$
- ☐ $\frac{2}{3} e^{2x} \sin 3x + \frac{1}{3} e^{2x} \cos 3x + C$

- ☐ $\frac{1}{2} e^{2x} \sin 3x - \frac{3}{4} e^{2x} \cos 3x + C$
- ☐ $\frac{2}{13} e^{2x} \sin 3x - \frac{3}{13} e^{2x} \cos 3x + C$
- ☐ $\frac{2}{3} e^{2x} \sin 3x - \frac{4}{3} e^{2x} \cos 3x + C$

Question 5

$$\int \sin(\ln x) dx =$$

- ☐ $2x \cos(\ln x) + C$
- ☐ $\frac{x}{2} [\sin(\ln x) - \cos(\ln x)] + C$
- ☐ $2x \sin(\ln x) + C$
- ☐ $x[\sin(\ln x) - \cos(\ln x)] + C$
- ☐ $\frac{x}{2} [\sin(\ln x) + \cos(\ln x)] + C$
- ☐ $x[\sin(\ln x) + \cos(\ln x)] + C$

Question 6

$$\int \ln^2 x dx =$$

- ☐ $\ln^2 x + x \ln x - 2x + C$
- ☐ $\ln^2 x - 2x + C$
- ☐ $\frac{1}{2} \ln^2 x - x \ln x + C$
- ☐ $x(\ln^2 x - 2 \ln x + 2) + C$
- ☐ $x \ln^2 x - \ln x + 2x + C$
- ☐ $x(\ln^2 x + \ln x - 2) + C$

Question 7

$$\int \arcsin 2x \, dx =$$

- ☐ $\arcsin 2x + 2\sqrt{1 - 4x^2} + C$
- ☐ $2x \arcsin 2x + 8\sqrt{1 - x^2} + C$
- ☐ $x \arcsin 2x + 2\sqrt{1 - x^2} + C$
- ☐ $x \arcsin 2x + \frac{1}{2} \sqrt{1 - 4x^2} + C$
- ☐ $\arcsin 2x + \frac{1}{4} \sqrt{1 - 2x^2} + C$
- ☐ $x \arcsin 2x + \frac{1}{2} \sqrt{1 - x^2} + C$

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

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