

MATH 224-001 — TEST II*PLEASE READ THESE INSTRUCTIONS:*

This test consists entire of integrals to evaluate (note this applies also to improper integrals, if convergent... if not, simply say “divergent” (and explain, of course)). Each is worth 20 points. Do as many as you like – points over 100 will count as extra credit.

If you want credit for an answer, *you must explain what you are doing – this means defining your terms and explaining each step in your work.*

You may use a graphing calculator, but **not** a calculator (such as the TI-89) capable of symbolic manipulation. You may not use your book or notes.

PLEASE TURN OFF YOUR CELL PHONE.

Here are some possibly useful formulæ:

$$^{[1]} \quad \sin^2 x = \frac{1}{2}(1 - \cos 2x)$$

$$^{[2]} \quad \cos^2 x = \frac{1}{2}(1 + \cos 2x)$$

$$^{[3]} \quad \sin 2\theta = 2 \sin \theta \cos \theta$$

$$^{[4]} \quad 1 + \tan^2 \theta = \sec^2 \theta$$

$$^{[5]} \quad \int \tan x \, dx = \ln |\sec x| + C$$

$$^{[6]} \quad \int \sec x \, dx = \ln |\sec x + \tan x| + C$$

$$^{[7]} \quad \cos A \cos B = \frac{1}{2}(\cos(A - B) + \cos(A + B))$$

$$^{[8]} \quad \int \frac{dx}{x^2 + a^2} = \frac{1}{a} \tan^{-1} \left(\frac{x}{a} \right) + C$$

$$^{[9]} \quad \int \sec^2 x \, dx = \tan x + C$$

$$^{[10]} \quad \int \sec x \tan x \, dx = \sec x$$

[Please note in your work below the number of any of these equations if you look it up here and use it in one of your solutions.]

[Please do not write in the boxes below:]

1 :	2 :	3 :	4 :	5 :	6 :	7 :	8 :	9 :	Σ :
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$$\boxed{1} \quad \int_1^2 \frac{\ln x}{x^2} dx$$

$$\boxed{2} \quad \int t \sec^2 2t dt$$

$$\boxed{3} \quad \int \cos \pi x \cos 4\pi x \, dx$$

$$\boxed{4} \quad \int_1^2 \frac{\sqrt{x^2 - 1}}{x} \, dx \quad [\textit{Hint: trig.}]$$

$$\boxed{5} \quad \int \frac{\sqrt{x^2 - 9}}{x^3} dx \quad [\textit{Hint: trig.}]$$

$$\boxed{6} \quad \int \frac{dx}{e^x - e^{-x}} \quad [\textit{Hint: algebra, subst., PF}]$$

7 $\int \frac{\sqrt{x}}{x-36} dx$ *[Hint: subst., PF]*

8 $\int_1^\infty \frac{x+1}{x^2+2x} dx$