

YOUR NAME: \_\_\_\_\_

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Read each problem **very carefully** before starting to solve it. Each problem is worth 5 points. It is necessary to show **all** your work. Correct answers without explanations are worth 0 points. GOOD LUCK!!

1. Compute the integral

$$\iint_{\mathcal{R}} \cos x \sin 2y \, dA, \text{ where } \mathcal{R} = \left[0, \frac{\pi}{2}\right] \times \left[0, \frac{\pi}{2}\right].$$

2. Consider the integral

$$\int_0^4 \int_0^{\sqrt{16-x^2}} \tan^{-1} \left( \frac{y}{x} \right) dy dx.$$

(a) Sketch the region of integration of the given integral.

(b) Evaluate the given integral by changing into polar coordinates.