

No books, notes, **or calculators**. Cross out what you do not want us to grade. You **must** show work to receive full credit. Please try to write neatly. You need not simplify your answers but you should evaluate standard trigonometric functions like  $\tan(\pi/3)$ . You **may not** use reduction formulas. You are required to **sign** your exam book. With your signature, you pledge that you have neither given nor received assistance on this exam.

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1. (12 points) Consider the region enclosed by the following curves:

$$y = 4x - x^2 \text{ and } y = x.$$

Set up but *do not evaluate* definite integrals which will give the volumes of the solids obtained by rotating this region about

(a) the line  $y = 7$

(b) the line  $x = -3$

2. (8 points) Write out the form of the partial fraction decomposition of the following function but **DO NOT EVALUATE THE CONSTANTS**.

$$\frac{x^5 - 2x + 1}{x^4 \cdot (x^2 + 9)^2 \cdot (x^2 - 6x - 7)}$$

Evaluate the following integrals:

3. (10 points)  $\int \cos^3(x) dx$

4. (10 points)  $\int \ln(2t) dt$

5. (10 points)  $\int \frac{dx}{\sqrt{4 + 9x^2}}$

6. (10 points)  $\int_0^2 \sqrt{16 - x^2} dx$

7. (10 points)  $\int_0^1 \frac{y}{e^{2y}} dy$

Please turn over.

8. (10 points)  $\int \frac{x^2 + 1}{x^2 - x} dx$

9. (10 points) Determine if the improper integral

$$\int_{-1}^0 \frac{1}{(x+1)^{4/3}} dx$$

is convergent or divergent. Evaluate the integral if it is convergent.

10. (10 points) Determine if the improper integral

$$\int_3^{\infty} \frac{e^{1/x}}{x^2} dx$$

is convergent or divergent. Evaluate the integral if it is convergent.