

MATH 150/GRACEY

NAME _____

EXAM 4/CHAPTER 4

HW _____% EXAM _____% QUIZ _____%

100 POINTS POSSIBLE/BOX YOUR FINAL ANSWER

SHOW ALL WORK FOR FULL CREDIT!!!

(56 POINTS) Problems 1-8. Evaluate the definite integrals and find the indefinite integrals: Each question is worth 8 points. EXACT ANSWERS ONLY!!!

1. $\int_{-8}^3 |x+5| dx$

2. $\int 3\theta^5 \csc^2 \theta^6 d\theta$

3. $\int \frac{x}{\sqrt{1-x}} dx$

4. $\int (1-x^2)^3 dx$

5. $\int \sin^2 \frac{x}{2} dx$

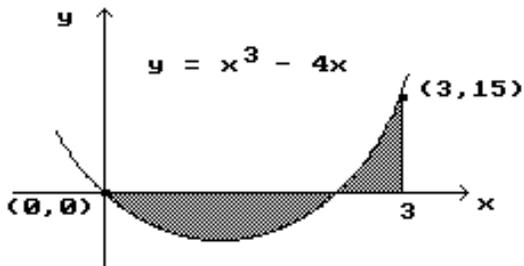
6. $\int \left(\frac{4x + x^{1/3}}{x^{2/3}} \right) dx$

7. $\int_3^5 \frac{x^3 - 1}{x - 1} dx$

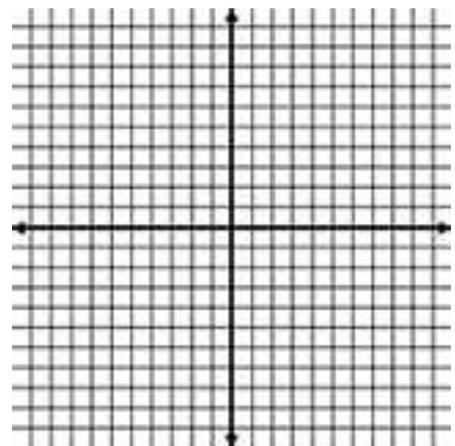
8. $\int_{\pi/4}^{\pi/3} \tan^3 x \sec^2 x dx$

9. (6 POINTS) Find the average value of the function $f(x) = \frac{4}{x^2}$ on the interval $[1, 4]$.

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10. (8 POINTS) Find the area of the shaded region.



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11. (8 POINTS) Sketch the region whose area is given by the definite integral. Then use a geometric formula to evaluate the integral. $\int_0^9 \sqrt{81 - x^2} dx$.



12. (8 POINTS) Evaluate the definite integral by the **limit definition**.

$$\int_0^3 (1 - x^2) dx$$

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13. (8 POINTS) Find the area of the region bounded by $y = \cos x + \sin 2x$, the x -axis, $x = 0$ and $x = \frac{\pi}{2}$.

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14. (6 POINTS) Suppose that g is continuous and that $\int_3^7 g(x) dx = 8$ and $\int_3^{12} g(x) dx = 5$. Find $\int_{12}^3 g(x) dx$.

Theorem: Summation Formulas

1.
$$\sum_{i=1}^n c = cn$$

2.
$$\sum_{i=1}^n i = \frac{n(n+1)}{2}$$

3.
$$\sum_{i=1}^n i^2 = \frac{n(n+1)(2n+1)}{6}$$

4.
$$\sum_{i=1}^n i^3 = \frac{n^2(n+1)^2}{4}$$