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RECITATION INSTRUCTOR	Page 3	/28
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RECITATION TIME	TOTAL	/100
DIRECTIONS		
1. Write your name, student ID number, recitation instrint in the space provided above. Also write your name a		

- 2. The test has four (4) pages, including this one.
- 3. Write your answers in the boxes provided.
- 4. You must show sufficient work to justify all answers. Correct answers with inconsistent work may not be given credit.
- 5. Credit for each problem is given in parentheses in the left hand margin.
- 6. No books, notes or calculators may be used on this test.

Find the integrals in problems 1–6.

(6)	1.	$\sec^4 x dx$
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(6) 2.
$$\int_0^{\frac{\pi}{2}} \sin^2(2x) dx$$

	 	•	
			1
			- 1

(6) 3.
$$\int_0^1 x\sqrt{x^2+1} dx$$
 (Hint: trigonometric substitution is not necessary).

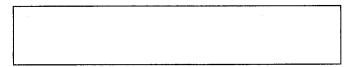
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 $(12) \quad 4. \quad \int \frac{1}{x^2 \sqrt{25 - x^2}} \, dx$



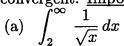
(12) 5.
$$\int \frac{x^2 + 3}{x^3 + 2x} \, dx$$



(8) 6.
$$\int_0^2 \frac{x^2}{x^2 + 4} \, dx$$

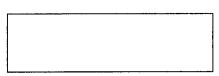
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(12) 7. Determine whether each integral is convergent or divergent. Find its value if it is convergent. Important: You must show clearly how limits are involved.

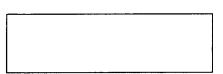




(b) $\int_0^3 \frac{1}{\sqrt{x}} \, dx$



(10) 8. Find the length of the curve y = f(x), $0 \le x \le \frac{\pi}{3}$, given that $f'(x) = 2\sqrt{\cos x + \cos^2 x}$.



(6) 9. Write out the form of the partial fraction decomposition of the function below. <u>Do not</u> determine the numerical values of the coefficients.

$$\frac{x+3}{(x^2-5x+4)(x^2+6)^2}$$

- (12) 10. Consider the lamina bounded by the curves $y = \sqrt{x}$, y = 0, x = 1 and with density $\rho = 1$. Find the following:
 - (a) The mass m of the lamina

m =

- (b) The moment M_y of the lamina about the y-axis
- $M_y =$
- (c) The moment M_x of the lamina about the x-axis
- $M_x =$

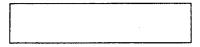
(d) The center of mass (\bar{x}, \bar{y}) of the lamina

(ar x,ar y)=

- (10) 11. Determine whether the sequence converges or diverges. If it converges, find the limit. (You need not show work for this problem).
 - (a) $a_n = \frac{5^{n+1}}{2^n}$



(b) $a_n = \frac{n!}{(n+2)!}$



(c) $a_n = \frac{1 + 5\sqrt{n}}{3\sqrt{n} - 2}$



(d) $\left\{ (-1)^n \sin\left(\frac{1}{n}\right) \right\}$



(e) $a_n = \frac{\ln(n^2)}{n}$