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| RECITATION INSTRUCTOR | Page 3 | /24 |
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| RECITATION TIME | TOTAL | /100 |

DIRECTIONS

- 1. Write your name, 10-digit PUID, recitation instructor's name and recitation time in the space provided above. Also write your name at the top of pages 2, 3 and 4.
- 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 unless otherwise stated in the problem. 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, calculators or any electronic devices may be used on this exam.

| (6) | 1. Find the domain of the function $h(x) =$ | $\frac{1}{\sqrt[4]{x^2-5}}$ | = $5x$ |
|-----|---|-----------------------------|--------|
| | Ser. | | |

(8) 2. If f(x) = 1 - 3x and $g(x) = \cos x$, find the following

$$(f \circ g)(x) =$$

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(6) 3. Find all values of x in the interval $[0, 2\pi]$ that satisfy the equation $\cos x + \sin 2x = 0$.



(6) 4. If $f(x) = \ln(x+3)$ find a formula for the inverse function $f^{-1}(x)$.



- (4) 5. Solve each equation for x.
 - (a) $2 \ln x = 1$

x =

(b) $e^{-x} = 5$

x =

- (6) 6. If $f(x) = \begin{cases} \frac{x^2 x}{x^2 1} & \text{if } x \neq 1 \\ 1 & \text{if } x = 1 \end{cases}$ explain why f is discontinuous at a = 1.
- (6) 7. Find the exact numerical value of the following:
 - (a) $\log_{49} e^{4 \ln 7}$

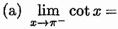
(b) $\ln(\log_2 2008 - \log_2 1004)$



(c) $\sin(\ln\sqrt{e^{\pi}})$



(10) 8. For each of the following, fill in the boxes below with a finite number or one of the symbols $+\infty$, $-\infty$, or DNE (does not exist). It is not necessary to give reasons for your answers.





(b) $\lim_{x\to 0^-} \frac{x}{|\sin x|} =$



(c) $\lim_{r \to 9} \frac{\sqrt{r}}{(r-9)^2} =$



(d) $\lim_{x \to \infty} \cos x =$



(e) $\lim_{x\to 3^+} \frac{2|x-3|}{x-3} =$



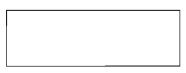
(6) 9. Find the equations of the vertical and horizontal asymptotes of the graph of $y = \frac{5x^2 - 2x + 1}{x^2 - x - 2}$.

Vertical asymptotes

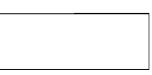
Horizontal asymptotes

(8) 10. Show that there is a root of the equation $x^2 - x - 1 = \frac{1}{x+1}$ in the interval (1, 2). State the name of the theorem you are using.

(10) 11. Find the derivative of the function $g(t) = \sqrt{t}$ using the definition of the derivative $g'(t) = \lim_{h \to 0} \frac{g(t+h) - g(t)}{h}$. (0 credit for using a formula for the derivative).



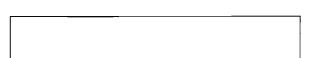
(8) 12. Find an equation of the tangent line to the curve $y = x\sqrt{x}$ that is parallel to the line y = 1 + 3x



- (16) 13. Find the derivatives of the following functions. Do not simplify.
 - (a) $g(t) = 4 \sec t + \tan t$.



(b) $y = e^x(1 + \cot x)$.



(c) $f(x) = \frac{xe^x}{\sin x}$.



(d) $u = \sqrt[5]{t} + 4\sqrt{t^5}$.

