

PRACTICE Test II

MA141-008

09/12/2018 Name: _____

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Read all of the following information before starting the exam:

- Complete each problem. Show all of your work clearly and in order and justify your answers, as partial credit will be given when appropriate and there may be NO credit given for problems without supporting work. **Circle or otherwise indicate your final answers your final answers.** All answers should be completely simplified, unless otherwise stated.

You may not use calculator.

1. Find the domain of $\frac{1}{\sin x - 1}$

2. Let $f(x) = \sqrt{2x}$ and $g(x) = x^2 - 1$. Let A be domain of definition of $f \circ g$. Determine if

$$h(x) = \begin{cases} (f \circ g)(x) & x \in A \\ (g \circ f)(x) & \text{else} \end{cases}$$

is continuous in \mathbb{R} .

3. Find the inverse functions to the following functions and state the domain D and range R of both:

(a) $f(x) = \log_{10}(x^2 + 10)$

(b) $f(x) = \frac{1}{1+e^{-x}}$

4. Find the following limits or show they do not exist. Show your work in detail.

(a) $\lim_{x \rightarrow 0} \sqrt{\frac{9}{x^2} + \frac{1}{x}} - \frac{3}{x} =$

(b) $\lim_{x \rightarrow 0} \frac{\sqrt{1-x^2}-1}{x^2} =$

(c) $\lim_{x \rightarrow \infty} \left(1 - \frac{1}{2x}\right)^{3x} =$

(d) $\lim_{x \rightarrow 0} x^2 e^{\sin \frac{1}{x}}$

(e) $\lim_{x \rightarrow \infty} \frac{x^2-1}{x^2+1} =$

5. Find first derivative ($\frac{dy}{dx}$) of the following functions

(a) $y = \left(\frac{1}{x} + x\right) \left(\frac{1}{x} - x^2\right)$

(b) $y = \left[\left(\sqrt{x^2 + 1} + \frac{x}{\sqrt[3]{x+1}} \right)^{7/3} \right] =$

(c) $y = \arctan(1 + \cos x)$

6. Find an equation of the tangent line to the curve given by

$$x^2 + xy + 2y^2 = 4$$

at point (1,1).

Good luck!