

171 EXAM II – November 12, 2002

NAME: _____

T.A.: _____

INSTRUCTIONS: Show all your work. Answers alone will receive little or no credit. Be neat. We do not want to be required to guess at what you're doing. We must be able to see how you got to your answer. **Take your time and be careful with your calculations. A mistake early in your work could be costly.**

1. _____

2. _____

3. _____

4. _____

5. _____

6. _____

7. _____

TOTAL _____

1. (20 p'ts.) Differentiate the following:

a) $y = (x^4 - 1)(x^2 + 1)$

Ans. $y' =$ _____

b) $y = \frac{2x-1}{x-1}$

Ans. $y' =$ _____

2. (15 p'ts.) A ball rolls down a long inclined plane so that its distance s from the starting point after t seconds is

$$s = 4.5t^2 + 3t \text{ feet.}$$

When will its instantaneous velocity be 30 feet per second?

Ans. $t =$ _____

3. (10 p'ts.) F is the composition of two functions, $F(x) = (f \circ g)(x)$, where $g(x) = x^3$ and the first derivative $f'(x) = \frac{1}{x}$. Find $F'(x)$.

Ans. $F'(x) =$ _____

4. (15 p'ts.) The graph of $x^2 - xy + y^2 = 16$ is an ellipse. Find equations for the tangent lines to the ellipse at the two points where the ellipse intersects the x-axis.

Ans. _____

5. (15 p'ts.) For the right triangle ABC with $\gamma = 90^\circ$, express c in terms of a and β .

Ans. $c =$ _____

6. (15 p'ts.) Verify the identity

$$\frac{1}{\cot(\alpha) - \cot(\beta)} = \frac{\sin(\alpha) \sin(\beta)}{\sin(\alpha + \beta)}$$

7. (10 p'ts.) Find all solutions in the interval $[0, 2\pi)$ to $\tan(2t) - 2 \cos t = 0$.

Ans. $t =$ _____