

## MAT 175 HOMEWORK #1

DUE SEPTEMBER 21 (WEDNESDAY)

**Note:** Please indicate your student ID. Numbering of problems is as in the course textbook.

(1.7.6) Find the indicated limit or state that it does not exist:

$$\lim_{z \rightarrow 2} \frac{z^2 - 4}{z^2 + z - 6}$$

(1.7.14) Find the indicated limit or state that it does not exist:

$$\lim_{x \rightarrow 1^-} \frac{|x - 1|}{x - 1}$$

(2.10.12) Find the indicated derivative:

$$D_t (t\sqrt{2t+6})$$

(2.10.22) Find the indicated derivative:

$$\frac{d}{dx} \left( \frac{\sin 3x}{\cos 5x^2} \right)$$

(2.10.42) Show that the tangent lines to the curves  $y^2 = 4x^3$  and  $2x^2 + 3y^2 = 14$  at  $(1, 2)$  are perpendicular to each other. (*Hint:* Use implicit differentiation.)

(3.10.10) Let

$$f(x) = (x - 1)^3(x + 2)^2 \quad \text{on } [-2, 2]$$

Determine the critical points, evaluate  $f$  at these points, and find the global maximum and minimum values of  $f$  on the given interval.

(3.10.42) A page of book is to contain 27 square inches of print. If the margins at the top, bottom, and one side are 2 inches and the margin at the other side is 1 inch, what size page would use the least paper?

(4.7.2) Evaluate the indicated integral:

$$\int_1^2 \frac{2x^4 - 3x^2 + 1}{x^2} dx$$

(4.7.6) Evaluate the indicated integral:

$$\int_0^{\pi/2} \cos^4 x \sin x dx$$

(4.7.10) Evaluate the indicated integral:

$$\int_2^3 \frac{y^2 - 1}{(y^3 - 3y)^2} dy$$