

Math 1300-005 - Spring 2017

The Intermediate Value Theorem - 1/31/17

Guidelines: Please work in groups of two or three. Please show all work and clearly denote your answer.

1. Use the Intermediate Value Theorem to show that there is a root of the given equation in the specified interval. Remember, in solving each problem, you must verify that each of the hypotheses of the IVT are satisfied.

(a) $x^4 + x - 3 = 0$, $(1, 2)$

(b) $\sqrt[3]{x} = 1 - x$, $(0, 1)$

(c) $e^x = 3 - 2x$, $(0, 1)$

(d) $\sin(x) = x^2 - x$, $(1, 2)$

The following problems are review of the material we covered Monday 1/30 over the definition of continuity.

2. State the interval(s) where the following function is continuous.

$$f(x) = \begin{cases} \cos(x) & \text{if } x < 0 \\ 0 & \text{if } x = 0 \\ 1 - x^2 & \text{if } x > 0 \end{cases}$$

3. For what value of the constant c is the function f continuous on $(-\infty, \infty)$?

$$f(x) = \begin{cases} x + 2 & \text{if } x < 0 \\ e^{2x+c} & \text{if } x \geq 0 \end{cases}$$