Calculus I **Fall 2014**

Continuity and the IVT

Discussion session 5 - 9 September 2014

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1. (do on board with everyone) Determine the values of a and b such that the following function f is continuous everywhere.

$$f(x) = \begin{cases} 2 & \text{if } x \leqslant -1, \\ ax - b & \text{if } -1 < x \leqslant 3, \\ -2 & \text{if } x > 3. \end{cases}$$

2. (do on board with everyone) What is the definition of continuity?

3. (do on board with everyone) What is the statement of the intermediate value theorem?

4. (give to do in groups) Use the intermediate value theorem to show that the function $f(x) = xe^{-x} + \frac{1}{2}$ has a zero on the interval $[-5, 5]$. Write down a complete sentence for your answer.

5. (give to do in groups or on board) Find an interval of length $1/2$ that contains a zero of the function $f(x) = \cos(\pi x)$.