

**Solution to Exercise 5, Chapter 2:**

Let  $Y$  denote the spot where the dart hits, and let  $c$  be our guess. The expected loss is of the form  $E[g(Y)]$ , where

$$g(Y) = \begin{cases} 2(c - Y), & \text{if } Y < c \\ Y - c, & \text{if } Y \geq c \end{cases} \quad (1)$$

So by (2.15),

$$E(\text{loss}) = E[g(Y)] = \int_0^c 2(c - t) 2t dt + \int_c^1 (t - c) 2t dt \quad (2)$$

Evaluating, differentiating and setting to 0, we find that  $c = 1/\sqrt{3}$ .