

## Second Chance

**Question:** Roll a die, and you get paid what the dice shows. But if you want, you can request a second chance and roll the die again; get paid what the second roll shows instead of the first. What is the expected value?

**Solution:** Expected value of second roll is 3.5. So if the outcome of first roll is less than 3.5, request a second chance.

Thus, the expected value is

$$E(X|X_1 < 3.5) \cdot P(X_1 < 3.5) + E(X|X_1 > 3.5) \cdot P(X_1 > 3.5) = 3.5 \times 1/2 + 5 \times 1/2 = 17/4.$$