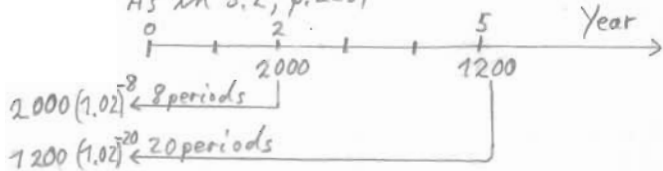


NAME: _____, I.D.# _____

NOTE: Show complete work for full credit.

Q1. Suppose that Mr. Smith owes Mr. Jones two sums of money: \$2000, due in two years, and \$1200, due in five years. If Mr. Smith wishes to pay off the total debt now by a single payment, how much should the payment be? Assume an interest rate of 8% compounded quarterly.

As in 5.2, p. 223f



$$Sum = 2000 \cdot (1.02)^{-8} + 1200 \cdot (1.02)^{-20} = 2514.55$$

Payment: \$ 2514.55

Q2. A landscaper earns \$300 per day when working and loses \$45 per day when not working. If the probability of working on a day is 60%, find the landscaper's expected daily earning.

Let X = "earning on one day"

Two possible outcomes $x = 300$ and $x = -45$ with probabilities 0.6 and 0.4, resp.

$$E(X) = \sum x f(x) = \sum x P(X=x) = 300 \cdot 0.6 + (-45) \cdot 0.4 = 180 - 18 = 162$$

Expected daily income: \$ 162

Q3

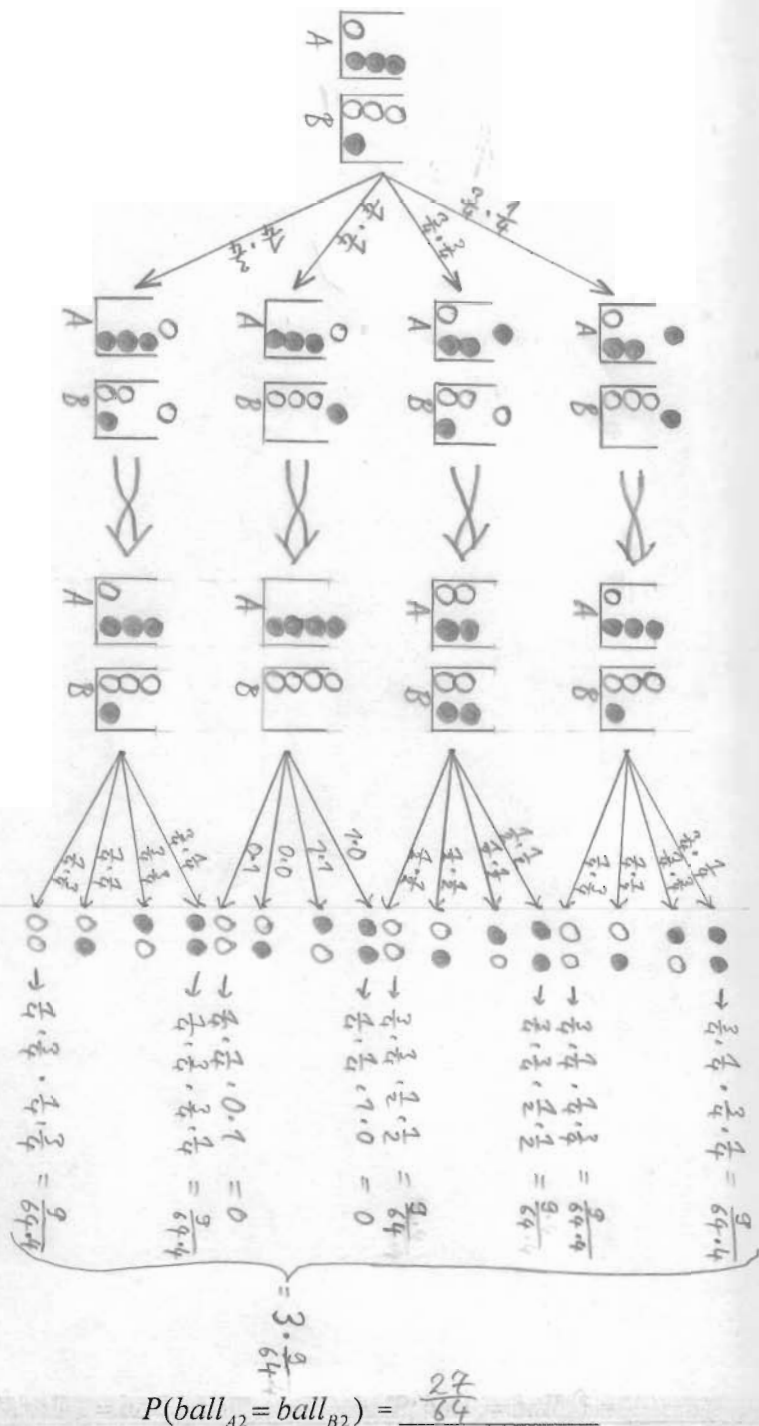
(a) Box A contains 1 green and 3 red balls, box B contains 1 red and 3 green balls. One ball is selected at random from each box. Determine the probability that both balls have the same color.

Let R_A = "red ball drawn from A", define G_A, R_B, G_B analogues.

$$\begin{aligned} P(ball_A = ball_B) &= P((R_A \cap R_B) \cup (G_A \cap G_B)) \\ &= P(R_A \cap R_B) + P(G_A \cap G_B) \quad [\text{mutually exclusive}] \\ &= P(R_A) \cdot P(R_B) + P(G_A) \cdot P(G_B) \quad [\text{independ.}] \\ &= \frac{3}{4} \cdot \frac{1}{4} + \frac{1}{4} \cdot \frac{3}{4} \quad [\text{equiprob.}] \end{aligned}$$

$$P(ball_A = ball_B) = \frac{6}{16} = \frac{3}{8}$$

(b) After the experiment was finished, the two balls were returned into the boxes. However, by accident, the ball from the first box A was put into the second box B, and the ball from box B went into box A. Determine the probability that in a second trial both balls have the same color (assuming that we do not know the result from the first trial).



$$P(ball_{A2} = ball_{B2}) = \frac{27}{64}$$