Evaluation 4

Evaluation 4 Problem 1

1.0/1.0 point (graded)

You play a game in which you are dealt one card at random from a standard deck of 52 cards. The payoffs are:

- $\$10$ if you get a face card (a jack, a queen, or a king)
- Twice the number showing on a number card: $\$2$ for an ace, $\$4$ for a 2, and so on up to $\$20$ for a 10

What is the expected value of the game? *Choose the best answer.*

- $10+2+4+\cdots+20$
- $\frac{3}{52}\times 10+\frac{1}{52}\times 2+\frac{1}{52}\times 4+\cdots+\frac{1}{52}\times 20$
- $\frac{3}{13}\times 10+\frac{1}{13}\times 2+\frac{1}{13}\times 4+\cdots+\frac{1}{13}\times 20$ ✔
- $\binom{13}{3}\times 10+\binom{13}{2}\times 2+\binom{13}{4}\times 4+\cdots+\binom{13}{20}\times 20$

Submit You have used 1 of 2 attempts

Answers are displayed within the problem

Evaluation 4 Problem 2

1.0/1.0 point (graded)

In a variant of the game in Problem 1, you are, again, dealt one card from a standard deck of 52 cards. However, now the payoffs are:

- $\$20$ for a face card (a jack, a queen, or a king)
- $\$10$ if the number is even (so a 2, 4, 6, 8, or 10)
- $\$5$ if the number is odd (so a 1, 3, 5, 7, or 9)

What is the expected value of this game? *Choose the best answer.*

- $\frac{3}{52} \times 20 + \frac{5}{52} \times 10 + \frac{5}{52} \times 5$
- $\frac{3}{13} \times 20 + \frac{5}{13} \times 10 + \frac{5}{13} \times 5$ ✔
- $\binom{13}{3} \times 20 + \binom{13}{5} \times 10 + \binom{13}{5} \times 5$
- $\frac{3}{13} \times 20 + \frac{1}{2} \times 10 + \frac{1}{2} \times 5$

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Answers are displayed within the problem

Evaluation 4 Problem 3

1.0/1.0 point (graded)

In a drastically simplified poker game, you are dealt two cards from a standard deck of 52 cards. The payoffs are:

- $\$50$ if you get a pair (two cards of the same denomination)
- $\$10$ if you get a flush (two cards of the same suit)

What is the expected value of the game? *Choose the best answer.*

- $\frac{13\times\binom{4}{2}}{\binom{52}{2}} \times 50 + \frac{4\times\binom{13}{2}}{\binom{52}{2}} \times 10$ ✔
- $\frac{13\times\binom{4}{2}}{52^2} \times 50 + \frac{4\times\binom{13}{2}}{52^2} \times 10$
- $\frac{4\times13}{52} \times 50 + \frac{13\times4}{52} \times 10$
- $\frac{4}{52} \times 50 + \frac{13}{52} \times 10$

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Answers are displayed within the problem

Evaluation 4 Problem 4

1.0/1.0 point (graded)

Consider a slot machine like the one described in Lesson 4.2, with three reels, each of which has five pictures: an apple, a cherry, a lemon, grapes, and a bell. However, in this version, the payoffs are:

- $25 for three bells
- $10 for three of the same fruit
- $3 for two bells plus one fruit

What is the expected value of this game? *Choose the best answer.*

- $\frac{1}{5^3} \times 25 + \frac{4}{5^3} \times 10 + \frac{3\times4}{5^3} \times 3$ ✔

- $\frac{1}{\binom{5}{3}} \times 25 + \frac{4}{\binom{5}{3}} \times 10 + \frac{3 \times 4}{\binom{5}{3}} \times 3$
- $\frac{5}{5^3} \times 25 + \frac{4^2}{5^3} \times 10 + \frac{3^3}{5^3} \times 3$
- $\frac{3}{5^3} \times 25 + \frac{3 \times 4}{5^3} \times 10 + \frac{2 \times 3 \times 4}{5^3} \times 3$

Submit You have used 1 of 2 attempts

Answers are displayed within the problem

Evaluation 4 Problem 5

1.0/1.0 point (graded)

In a variant of the game in Problem 4, again, consider a slot machine like the one described in Lesson 4.2, with three reels, each of which has five pictures: an apple, a cherry, a lemon, grapes, and a bell. In this version, the payoffs are:

- $50 for three bells
- $20 for any combination of three fruits (for example: three apples; two apples and one cherry; one apple, one cherry, and one lemon)

What is the expected value of this game? *Choose the best answer.*

- $\frac{1}{\binom{5}{3}} \times 50 + \frac{4^3}{\binom{5}{3}} \times 20$
- $\frac{5}{5^3} \times 50 + \frac{4}{5^3} \times 20$
- $\frac{1}{5^3} \times 50 + \frac{4^3}{5^3} \times 20$ ✔

- $\frac{1}{5^3} \times 50 + \frac{2\times3\times4}{5^3} \times 20$

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Answers are displayed within the problem

Evaluation 4 Problem 6

1.0/1.0 point (graded)

Again, consider a slot machine like the one described in Lesson 4.2, with three reels.

However, suppose that this machine has six pictures on each reel: a bell and five different types of fruit. In this version, the payoffs are:

- **$50** for three bells
- **$10** for three of the same fruit
- **$2** for two bells plus one fruit

What is the expected value of this game? *Choose the best answer.*

- $\frac{1}{5^3} \times 50 + \frac{5}{5^3} \times 10 + \frac{3\times5}{5^3} \times 2$
- $\frac{1}{6^3} \times 50 + \frac{5}{6^3} \times 10 + \frac{3\times5}{6^3} \times 2$ ✔
- $\frac{1}{6^3} \times 50 + \frac{4}{6^3} \times 10 + \frac{3\times4}{6^3} \times 2$
- $\frac{1}{\binom{6}{3}} \times 50 + \frac{5}{\binom{6}{3}} \times 10 + \frac{3\times5}{\binom{6}{3}} \times 2$

Submit You have used 1 of 2 attempts

Answers are displayed within the problem

Evaluation 4 Problem 7

1.0/1.0 point (graded)

In their never-ending quest to siphon the money from your wallet, the carnival operators have come up with a new game: Super-Mega-Chuck-A-Luck! Here you roll seven dice, with payoffs as follows:

- A grand prize of $\$5,000$ if you roll seven of a kind
- $\$500$ if you roll six of a kind
- $\$50$ if you roll five of a kind

What is the expected value of Super-Mega-Chuck-A-Luck? *Choose the best answer.*

- $\frac{1}{6^7} \times 5,000 + \frac{7 \times 5}{6^7} \times 500 + \frac{\binom{7}{2} \times 5^2}{6^7} \times 50$
- $\frac{6}{6^7} \times 5,000 + \frac{7 \times 6 \times 5}{6^7} \times 500 + \frac{7^2 \times 6 \times 5}{6^7} \times 50$
- $\frac{6}{\binom{7}{6}} \times 5,000 + \frac{7 \times 6 \times 5}{\binom{7}{6}} \times 500 + \frac{\binom{7}{2} \times 6 \times 5^2}{\binom{7}{6}} \times 50$
- $\frac{6}{6^7} \times 5,000 + \frac{7 \times 6 \times 5}{6^7} \times 500 + \frac{\binom{7}{2} \times 6 \times 5^2}{6^7} \times 50$ ✔

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Answers are displayed within the problem

Evaluation 4 Problem 8

1.0/1.0 point (graded)

You play a game in which you roll a number n of dice. You win if you roll at least one 6, but no 1s or 2s; and, otherwise, you lose. What is the optimal number of dice to roll in this situation? *Choose the best answer.*

NOTE: This problem was updated on 05/03/2018 to correct an answer error. The problem has been rescored for previous attempts.

- 1
- 2 ✔
- 3
- 4

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Answers are displayed within the problem

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