1. Linda Lou offers Billy Bob to play a game which involves selecting a card from a regular 52-card deck and tossing a coin. The coin is a fair coin and is equally likely to land on heads or tails.

If the card is a face card, and the coin lands on Heads, Billy Bob wins $13

If the card is a face card, and the coin lands on Tails, Billy Bob wins $5

If the card is not a face card, Billy Bob loses $3, no matter what the coin shows.

If Billy Bob were to play this game 1779 times, what would Billy Bob's approximate winnings be? Round your answer to the nearest cent.

A. Billy Bob's winnings would be approximately -$54.74.

B. Billy Bob's winnings would be approximately -$588.44.

C. Billy Bob's winnings would be approximately $301.06.

D. Billy Bob's winnings would be approximately $478.96.

E. Billy Bob's winnings would be approximately -$410.54.

F. Billy Bob's winnings would be approximately -$232.64.

G. Billy Bob's winnings would be approximately -$766.34.

H. Billy Bob's winnings would be approximately -$944.24.

2. A company wants to evaluate its attrition rate, in other words, how long new hires stay with the company. Over the years, they have established the following probability distribution.

Let X = the number of years a new hire will stay with the company.

Let $P(X)$ = the probability that a new hire will stay with the company x years.
Use the table below to answer the following question.

X	$P(X)$
0	0.17
1	0.22
2	0.31
3	0.14
4	0.06
5	0.05
6	0.05

What is the average amount of time in years that an employee stays with this company. Round your answer to two decimal places.

A. The average amount of time an employee stays with the company is 2.03 years.

B. The average amount of time an employee stays with the company is 2 years.

C. The average amount of time an employee stays with the company is 2.08 years.

D. The average amount of time an employee stays with the company is 2.1 years.

E. The average amount of time an employee stays with the company is 2.07 years.

F. The average amount of time an employee stays with the company is 2.01 years.

G. The average amount of time an employee stays with the company is 2.02 years.

H. The average amount of time an employee stays with the company is 2.05 years.

3. Consider a ski resort whose profit depends on a random phenomenon: the weather.

If it snows more than 70 inches in a season, the resort makes a profit of $250000. This happens 25% of the time.

If it snows between 40 and 70 inches in a season, the resort's profits are cut in half: $100000. This happens 45% of the time.

If it snows less than 40 inches in a season, the resort's costs overwhelm revenue and it loses $80000. This happens 30% of the time.

What is the long-term average yearly profit for the resort?

A. The long-term average yearly profit is $83500.

B. The long-term average yearly profit is $79500.

C. The long-term average yearly profit is $84500.

D. The long-term average yearly profit is $88500.

E. The long-term average yearly profit is $77500.

F. The long-term average yearly profit is $91500.

G. The long-term average yearly profit is $73500.

H. The long-term average yearly profit is $74500.

4. A hospital researcher is interested in the number of times the average post-op patient will ring the nurse during a 12-hour shift. For a random sample of 50 patients, the following information was obtained.

x	$P(X = x)$
0	$\frac{3}{25}$
1	$\frac{3}{25}$
2	$\frac{9}{25}$
3	$\frac{6}{25}$
4	$\frac{7}{50}$
5	$\frac{1}{50}$

where X = the number of times a patient rings the nurse during a 12-hour shift.

For this exercise, $x = 0, 1, 2, 3, 4, 5$.

$P(X = x)$ = the probability that X takes on value x.

What is the long-term average of the number of calls a patient makes on a 12-hour shift? Round your answer to two decimal places.

A. During a 12-hour shift, a patient rings 2.17 times on average.

B. During a 12-hour shift, a patient rings 2.23 times on average.

C. During a 12-hour shift, a patient rings 2.25 times on average.

D. During a 12-hour shift, a patient rings 2.21 times on average.

E. During a 12-hour shift, a patient rings 2.27 times on average.

F. During a 12-hour shift, a patient rings 2.19 times on average.

G. During a 12-hour shift, a patient rings 2.26 times on average.

H. During a 12-hour shift, a patient rings 2.22 times on average.

5. The numbers racket is a well-entrenched illegal gambling operation in most large cities. One version works as follows: you choose one of the 1000 three- digit numbers 000 to 999 and pay your local numbers runner a dollar to enter your bet. Each day, one three-digit number is chosen at random and pays off $500.

Suppose Billy Bob makes one bet every day for 5 years. What should we expect the TOTAL of Billy Bob's "winnings" to be close to?

Ignore leap years. Round your answer to the nearest cent.

A. Billy Bob's total winnings should be close to −$545.67.

B. Billy Bob's total winnings should be close to −$180.67.

C. Billy Bob's total winnings should be close to −$1.83.

D. Billy Bob's total winnings should be close to −$728.17.

E. Billy Bob's total winnings should be close to −$1640.67.

F. Billy Bob's total winnings should be close to −$910.67.

G. Billy Bob's total winnings should be close to −$1275.68.

H. Billy Bob's total winnings should be close to −$363.17.

6. Suppose Sleazy P. Martini offers you the following deal. For a $10 fee, you may pick an envelope from a box containing 100 seemingly identical envelopes. However, each envelope contains differing amounts of cash.

7 of the envelopes contain $3.

80 of the envelopes contain $9.

1 of the envelopes contain $12.

12 of the envelopes contain $20.

Based upon your calculations of the gain or loss over the long run, what would you say to Sleazy P.?

A. "Sure, Sleazy P. I'll be happy to take your money over the long-term."

B. "Sorry, Sleazy P. I don't like your shenanigans."

7. Sleazy P. Martini offers Billy Bob to play a game which involves selecting a card from a regular 52-card deck and tossing a coin. The coin is a crooked coin with $P(\text{Heads}) = 0.41$ and $P(\text{Tails}) = 0.59$.

If the card is a face card, and the coin lands on Heads, Billy Bob wins $7.

If the card is a face card, and the coin lands on Tails, Billy Bob wins $5.

If the card is not a face card, Billy Bob loses $3, no matter what the coin shows.

If Billy Bob were to play this game repeatedly, what is the long-term average of Billy Bob's winnings? Round your answer to the nearest cent.

A. The long term average of Billy Bob's winnings is -$0.96.

B. The long term average of Billy Bob's winnings is -$0.86.

C. The long term average of Billy Bob's winnings is -$1.46.

D. The long term average of Billy Bob's winnings is -$1.06.

E. The long term average of Billy Bob's winnings is -$0.56.

F. The long term average of Billy Bob's winnings is -$1.16.

G. The long term average of Billy Bob's winnings is -$0.46.

H. The long term average of Billy Bob's winnings is -$1.26.

8. Suppose Sleazy P. Martini offers you the following deal. For a $10 fee, you may pick an envelope from a box containing 100 seemingly identical envelopes. However, each envelope contains differing amounts of cash.

10 of the envelopes contain $3.

80 of the envelopes contain $7.

4 of the envelopes contain $12.

6 of the envelopes contain $20.

If you were to play this game many times, what average gain or loss would you expect over the long run?

A. We would expect a long term loss of $2.42 per game.

B. We would expect a long term loss of $2.32 per game.

C. We would expect a long term loss of $2.22 per game.

D. We would expect a long term loss of $2.92 per game.

E. We would expect a long term loss of $1.92 per game.

F. We would expect a long term loss of $2.72 per game.

G. We would expect a long term loss of $2.62 per game.

H. We would expect a long term loss of $2.82 per game.