edX

Course > Section... > 3.3 Ass... > Questi...

Question 3: Betting on Roulette

A casino offers a House Special bet on roulette, which is a bet on five pockets (00, 0, 1, 2, 3) out of 38 total pockets. The bet pays out 6 to 1. In other words, a losing bet yields -$1 and a successful bet yields $6. A gambler wants to know the chance of losing money if he places 500 bets on the roulette House Special.

The following 7-part question asks you to do some calculations related to this scenario.

Question 3a

1/1 point (graded)
What is the expected value of the payout for one bet?

| -0.0789 | ✔ **Answer:** -0.0789 |

-0.0789

Explanation
The expected value can be calculated using the following code:

```
p <- 5/38
a <- 6
b <- -1
mu <- a*p + b*(1-p)
mu
```

| Submit | You have used 1 of 10 attempts |

ⓘ　Answers are displayed within the problem

Question 3b

1/1 point (graded)
What is the standard error of the payout for one bet?

| 2.37 | ✔ **Answer:** 2.37 |

2.37

Explanation

The standard error can be calculated using the following code:

```
sigma <- abs(b-a) * sqrt(p*(1-p))
sigma
```

| Submit | You have used 1 of 10 attempts |

ⓘ   Answers are displayed within the problem

Question 3c

1/1 point (graded)
What is the expected value of the average payout over 500 bets?
Remember there is a difference between expected value of the average and expected value of the sum.

| -0.0789 | ✔ **Answer:** -0.0789 |

−0.0789

Explanation

The expected value can be calculated using the following code:

```
mu
```

| Submit | You have used 2 of 10 attempts |

ⓘ   Answers are displayed within the problem

Question 3d

1/1 point (graded)
What is the standard error of the average payout over 500 bets?

Remember there is a difference between the standard error of the average and standard error of the sum.

| 0.106 |

✔ **Answer:** 0.106

0.106

Explanation

The standard error can be calculated using the following code:

```
n <- 500
sigma/sqrt(n)
```

| Submit | You have used 1 of 10 attempts

ℹ Answers are displayed within the problem

Question 3e

1/1 point (graded)
What is the expected value of the sum of 500 bets?

| -39.5 |

✔ **Answer:** -39.5

-39.5

Explanation

The expected value can be calculated using the following code:

```
n*mu
```

| Submit | You have used 2 of 10 attempts

ℹ Answers are displayed within the problem

Question 3f

1/1 point (graded)
What is the standard error of the sum of 500 bets?

52.9

✔ **Answer:** 52.9

52.9

Explanation

The standard error can be calculated using the following code:

```
sqrt(n) * sigma
```

Submit   You have used 1 of 10 attempts

ⓘ Answers are displayed within the problem

Question 3g

1/1 point (graded)

Use `pnorm()` with the expected value of the sum and standard error of the sum to calculate the probability of losing money over 500 bets, $\Pr(X \leq 0)$.

0.772

✔ **Answer:** 0.772

0.772

Explanation

The standard error can be calculated using the following code:

```
pnorm(0, n*mu, sqrt(n)*sigma)
```

Submit   You have used 1 of 10 attempts

ⓘ Answers are displayed within the problem