

1) Three fair dice are rolled.

If no 4 comes on the three dice you lose 100 Rupees.

Otherwise you win $100 \times (\text{number of 4s})$.

Suppose you decide to play this game once.

What are your chances of

- a) losing 100 Rupees,
- b) winning 100 Rupees,
- c) winning 200 Rupees,
- d) winning 300 Rupees?

Let X be the random variable representing your net gain (or loss) after one game.

What is the density of X ?

2) For the standard normal curve,

- a) find the area under the curve between 0 and 1
- b) find the area under the curve between 0 and 2
- c) find the area under the curve between -2 and 1
- d) find the area under the curve to the right of 1
- e) find the area under the curve to the left of 2
- f) find the area under the curve between -2.25 and 1.23

3) For a continuous random variable $X \sim N(100, 25)$,

- a) find $P(100 < X < 105)$ and explain why this answer matches the answer to question 2a
- b) find a value x such that $P(X < x) = 0.975$ (Hint: maybe some part of question 2 can help you)

4) Go to the URL <https://homepage.divms.uiowa.edu/~mbognar/applets/bin.html>

- a) Plot Binomial density for $n=10$ and $p=0.1$. Can it be approximated well by a Normal density?
- b) Change p from 0.1 till 0.9 in increments of 0.1 and plot Binomial density for each case. When does the Binomial density resemble a Normal density?
- c) Repeat part b) for $n=100$? When does the Binomial density resemble a Normal density?

5) For a discrete random variable $X \sim \text{Bin}(100, 0.8)$, what is the probability of getting more than 76 heads?