

Solutions to Practice for Quiz 3

Math 125 (Introductory Statistics) *Kovitz* Spring 2025

First set up the box model for the tossing of a fair coin: the two tickets in the box are one 0 and one 1.

The average and SD of the box are $1/2$ and $1/2$.

The number of heads will be modeled by the sum of the draws.

The expected value for the sum of the draws is the number of draws \times the average of the box. That is $100 \times (1/2) = 50$.

The standard error for the sum of the draws is the square root of the number of draws \times the SD of the box. That is $\sqrt{100} \times (1/2) = 10 \times (1/2) = 5$.

Since 53 heads is a discrete counting value, it is necessary to find the endpoints of that block on the probability histogram: 52.5 and 53.5.

Find the standard units for 52.5 and 53.5 on the normal approximation:

$$\frac{52.5-50}{5} = \frac{2.5}{5} = 0.5 \quad \text{and} \quad \frac{53.5-50}{5} = \frac{3.5}{5} = 0.7.$$

The area under the normal curve between the two half-areas from 0.5 to 0.7 will approximate the block on the probability histogram.

$$\frac{51.61\%}{2} - \frac{38.29\%}{2} = 25.805\% - 19.145\% = 6.66\%.$$

The answer is approximately 6.66%.

Note that here the continuity correction ($\pm 1/2$) must be used, otherwise the answer will not be found.

In some cases, when the SE is large (say above 40) or accuracy is not demanded, the correction may be left out. It is never incorrect to use it.