

# Stat 104 – Lecture 16

## Another Example

- 38% ( $p = 0.38$ ) of people in the United States have O+ blood type.
- If ten ( $n = 10$ ) people come in to donate blood, what is the chance that 3 ( $x = 3$ ) of them will have O+?

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## Example

- $n = 10, p = 0.38, x = 3$

$$P(3) = \binom{10}{3} (0.38)^3 (0.62)^7$$
$$= \frac{10!}{(3!)(7!)} (0.054872)(0.035216146)$$
$$P(3) = 0.2319$$

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$$P(3) = 0.2319$$

The screenshot shows a software interface with a table of binomial probabilities and a function menu. The table has columns for 'x' and 'P(x)'. The function menu is open, showing various mathematical functions. The 'Binomial Probability' function is highlighted, with the input '0.38, 10, x' visible in the input field.

x	P(x)
1	0.0084
2	0.0514
3	0.1419
4	0.2319
5	0.2497
6	0.1829
7	0.0934
8	0.0327
9	0.0075
10	0.0010
11	0.0001

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## Probability Distributions

- Continuous random variable
  - Numerical values that form an interval.
  - The probability distribution is specified by a curve that determines the probability the random variable falls in any particular interval.

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## Quantitative Variables

- Continuous variables
  - Height
  - Heart Rate

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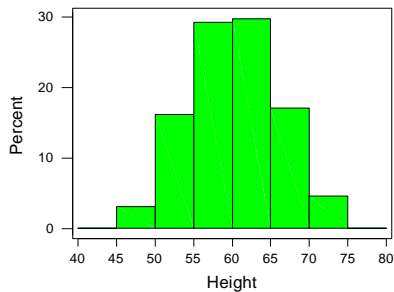
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## Describe the sample

- Shape is symmetric and mounded in the middle.
- Centered at 60 inches.
- Spread between 45 and 75 inches.
- 30% of the sample is between 60 and 65 inches.

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## Normal Models

- Our conceptualization of what the distribution of an entire population of values would look like.
- Characterized by a bell shaped curve with population parameters
  - Population mean =  $\mu$
  - Population standard deviation =  $\sigma$ .

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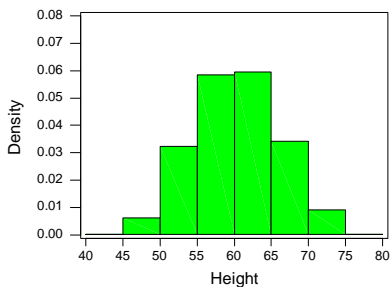
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Sample Data



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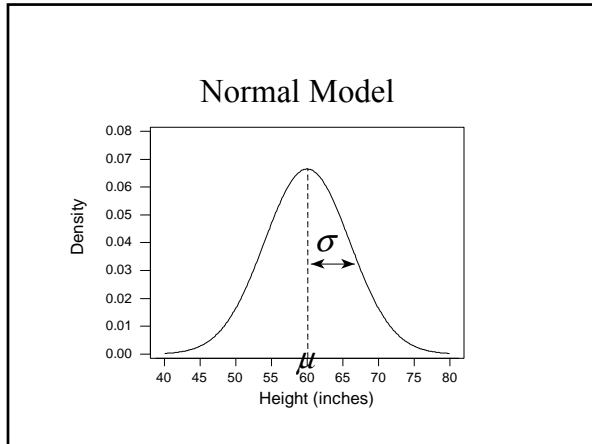
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Normal Model

- Height
- Center:
  - Mean,  $\mu = 60$  in.
- Spread:
  - Standard deviation,  $\sigma = 6$  in.

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68-95-99.7 Rule

- 68% of the values fall within 1 standard deviation of the mean.
- 95% of the values fall within 2 standard deviations of the mean.
- 99.7% of the values fall within 3 standard deviations of the mean.

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