

Lecture 9: Normal Approximation

Chapter 3.2

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Goals for Today

- ▶ Discuss how to find %'iles for negative values of z
- ▶ Examples
- ▶ Evaluating how “normal” certain data are.

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Solving Normal Questions

Whenever solving questions of this sort **ALWAYS** draw a rough picture first and keep in mind:

1. The normal distribution/curve is **symmetric**
2. The total area under the curve is 1

Normal Probability Tables

Alternatively, whereas

- ▶ table on P.429 gives areas to the left of positive values of z .
- ▶ table on P.428 gives areas to the left of negative values of z .

I'm only going to give you P.429 table for exams.

Speeding on I-5

The distribution of passenger vehicle speeds traveling on Interstate 5 Freeway (I-5) in California is nearly normal with a mean of 72.6 mph and a standard deviation of 4.78 mph.

- a) What percent of passenger vehicles travel slower than 80 mph?
- b) What percent of passenger vehicles travel between 60 and 80 mph?
- c) How fast to do the fastest 5% of passenger vehicles travel?
- d) The speed limit on this stretch of the I-5 is 70 mph. Approximate what percentage of the passenger vehicles travel above the speed limit on this stretch of the I-5.

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Speeding on I-5

- a) What percent of passenger vehicles travel slower than 80 mph?

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Speeding on I-5

b) What percent of passenger vehicles travel between 60 and 80 mph?

Speeding on I-5

c) How fast do the fastest 5% of passenger vehicles travel?

Speeding on I-5

d) The speed limit on this stretch of the I-5 is 70 mph. Approximate what percentage of the passenger vehicles travel above the speed limit on this stretch of the I-5.

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Switching Gears: Normal Approximation

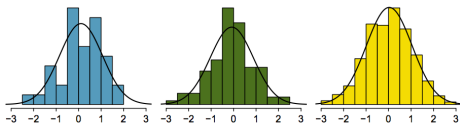
Although we stated that many processes in the physical world look bell-shaped, i.e. roughly normal, we must keep in mind that this is an **approximation**.

Question: How do we verify normality?

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Normal Approximation

What about these ones? How well do the histograms fit to the normal curve?



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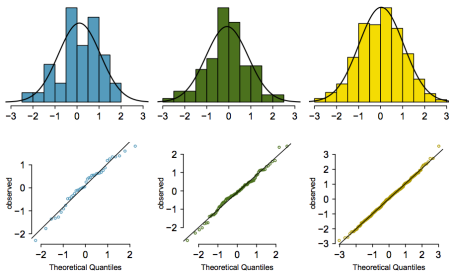
Normal Probability Plots

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Normal Probability Plots

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Normal Probability Plots



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Next Time

- ▶ Introduce some of the more useful other distributions: Bernoulli, Geometric, Binomial, and Poisson