

3.16 Class Notes: Normal Distribution (Day 3)

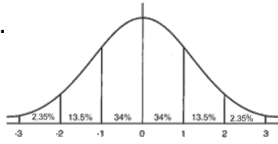
March 16, 2018

Homework: Normal Distribution & z-score Practice WS (posted on my website, mrsdinuzzo.weebly.com)

****Stat Unit Test will be on Monday, March 26th!****

Do Now: Check HW Answers.

- | | |
|---|---------------------------------|
| 1. $x < 7.91$ or $x > 8.09$ | 6. the man in 3rd world country |
| 2. 1.67 std. dev. away from mean,
z-score: -1.67 | 7. answers vary |
| 3a. -0.83 | 8. his brother |
| b. second test | 9a. 0.67 |
| 4. | b. 55.8 inches |
| | 10. 7.46 |
| | 11a. 16% |
| 5. a. 30 | b. 15.85% |
| b. 2.5% | c. 97.5% --> 780 women |



Example 1: The cholesterol levels for adult males of a specific racial group are normally distributed with a mean of 158.3 and a standard deviation of 6.6. Find $P(X > 150)$.

Find the z-score of a cholesterol level of 150.

What do you notice about the z-score?

➡
go to next slide
for answer

Example 1: The cholesterol levels for adult males of a specific racial group are normally distributed with a mean of 158.3 and a standard deviation of 6.6. Find $P(X > 150)$.

a) Find the z-score.

$$z \approx -1.26$$

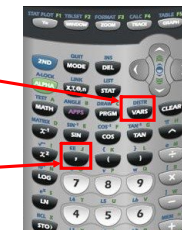
Notice the z-score is not ± 1 , ± 2 , ± 3 , so we can not use the Empirical Rule. In order to find this area, you must use your graphing calculator.

So, if z-score is ± 1 , ± 2 , ± 3 , use the Empirical Rule to find a given probability. If not, use your graphing calc and the following steps.

Using the graphing calculator to find the area under the curve

1. Clear all equations in $y =$ and turn off all plots
2. Go to WINDOW and enter the following settings*:
Xmin = -4, Xmax = 4, Xscl = 1, Ymin = 0, Ymax = 0.5, Yscl = 0.25
*this will be a helpful window whenever using this process

3. Select 2nd [DISTR] (VARS button)
4. Arrow over to Draw and select 1:ShadeNorm
5. Enter in the lower z-score, upper z-score**
**If one of the boundaries is $-\infty$ or ∞ , use -E99 or E99
Select 2nd [EE]

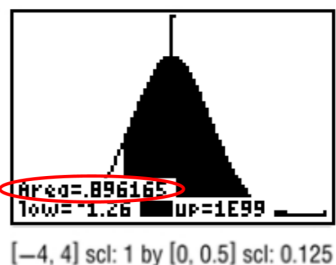


6. For this example, lower = -1.26 and upper = E99
7. The calculator should already have set $\mu = 0$ and $\sigma = 1$

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go to next slide
for answer

This should now be displayed on your calculator:

Area $\approx .896$, so the probability a man's cholesterol is greater than 150 is 89.6%



Note: In order to clear this display before drawing a new area, select 2nd [DRAW] (program button). Then select 1:ClrDraw.

Example 2: The cholesterol levels for adult males of a specific racial group are normally distributed with a mean of 158.3 and a standard deviation of 6.6. Find $P(145 < X < 165)$.

$z \approx -2.02$

$z \approx 1.02$

```
normalcdf
lower:-2.02
upper:1.02
μ:0
σ:1
Paste
```

```
normalcdf(-2.02,
.8244441318
```

$P(145 < X < 165) = 82.4\%$

Example 2: The cholesterol levels for adult males of a specific racial group are normally distributed with a mean of 158.3 and a standard deviation of 6.6. Find $P(145 < X < 165)$.

Another Calculator Method:

1. Select 2nd [DISTR]
2. Select 2:normalcdf(
3. Enter in the lower z-score, upper z-score
4. Select Paste, then press Enter

The calculator should automatically list $\mu = 0$ and $\sigma = 1$, which are the standardized mean and standard deviation. If you have a TI-83, you may need to enter them yourself. Simply enter the values so they always appear in the following order:

→ go to next slide for answer

Practice: Admission prices for movies are normally distributed. The average admission charge for a movie is \$8.12. If the standard deviation is \$0.79, what is the probability that a randomly selected admission is *less than* \$6.50?

→ go to next slide for answer

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Practice: Admission prices for movies are normally distributed. The average admission charge for a movie is \$8.12. If the standard deviation is \$0.79, what is the probability that a randomly selected admission is *less than* \$6.50?


$$z \approx -2.05$$

$$2.02\%$$

Practice: The life spans of a certain tread of tire are normally distributed with a mean of 31,066 miles and a standard deviation of 1,644 miles.

a) Find $P(30,000 < X < 32,000)$

b) Find $P(X > 34,000)$


go to next slide
for answer

Practice: The life spans of a certain tread of tire are normally distributed with a mean of 31,066 miles and a standard deviation of 1,644 miles.

a) Find $P(30,000 < X < 32,000)$

$$z \approx -0.65 \quad 46.8\%$$

$$z \approx 0.57$$

b) Find $P(X > 34,000)$

$$z \approx 1.78 \quad 4.8\%$$

Practice Worksheet