

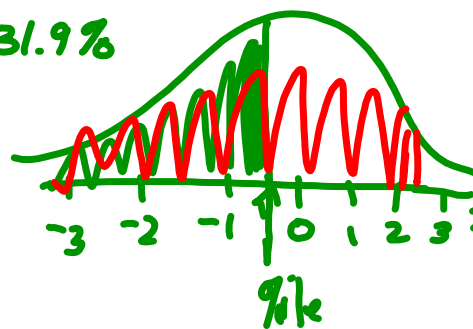
6. For the z-scores below, find the percentile rank (percent of individuals scoring below):

a) -0.47

$$\text{normalcdf}(-10, -0.47) = .319 = 31.9\%$$

b) 2.24

$$\text{normalcdf}(-10, 2.24) = .987 = 98.7\%$$



7. For the numbers below, find the percent of cases falling above the z-score:

a) 0.24

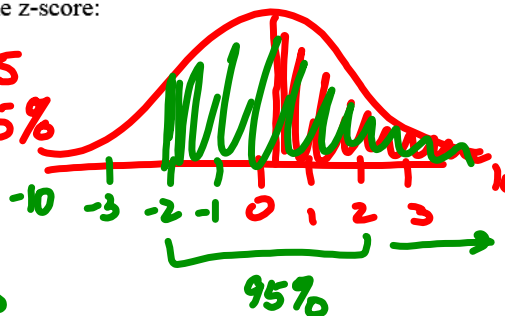
$$\text{normalcdf}(.24, 10) = .405$$

40.5%

b) -2.07

$$\text{normalcdf}(-2.07, 10) = .981$$

98.1%

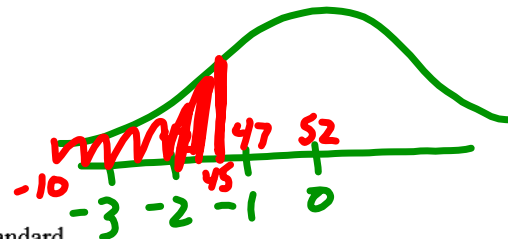


8. A patient recently diagnosed with Alzheimer's disease takes a cognitive abilities test and scores a 45. The mean on this test is 52 and the standard deviation is 5. What is the patient's percentile rank?

$$z = \frac{45 - 52}{5} = \frac{-7}{5} = -1.4$$

$$\text{normalcdf}(-10, -1.4) = .081$$

8.1%

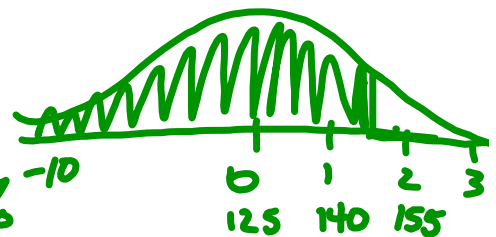


9. A fifth grader takes a standardized achievement test (mean = 125, standard deviation = 15) and scores a 148. What is the child's percentile rank?

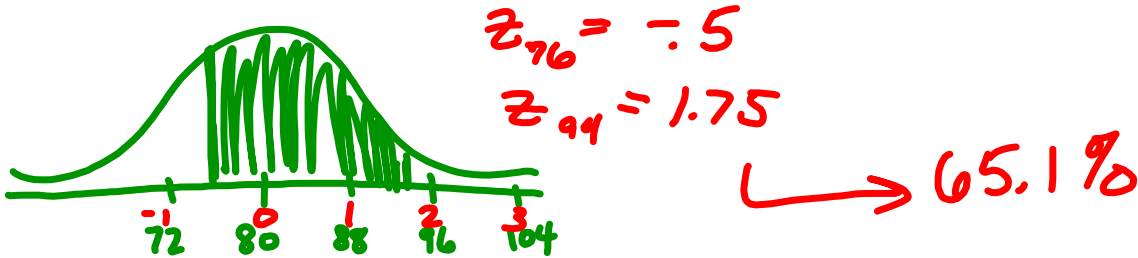
$$z = \frac{148 - 125}{15} = \frac{23}{15} = 1.5\bar{3}$$

$$\text{normalcdf}(-10, 1.5\bar{3}) = .937$$

93.7%



10. Pat and Chris both took a spatial abilities test (mean = 80, std. dev. = 8). Pat scores a 76 and Chris scored a 94. What percent of individuals would score between Pat and Chris?



11. A normal distribution of scores has a standard deviation of 10. Find the z-scores corresponding to each of the following values:

- A score of 60, where the mean score of the sample data values is 40.
- A score that is 30 points below the mean.
- A score of 80, where the mean score of the sample data values is 30.
- A score of 20, where the mean score of the sample data values is 50.

12. IQ scores have a mean of 100 and a standard deviation of 16. Albert Einstein reportedly had an IQ of 160.

- a. What is the difference between Einstein's IQ and the mean?

$$160 - 100 = 60$$

- b. How many standard deviations is that?

$$\frac{60}{16} = 3.75$$

- c. Convert Einstein's IQ score to a z score.

$$z = 3.75 \text{ or } z = \frac{160 - 100}{16} = 3.75$$

- d. If we consider "usual IQ scores to be those that convert z scores between -2 and 2, is Einstein's IQ usual or unusual?

Very unusual b/c  $> 3$  SD.  
from the mean

13. Women's heights have a mean of 63.6 in. and a standard deviation of 2.5 inches. Find the z score corresponding to a woman with a height of 70 inches and determine whether the height is unusual.

$$z = \frac{70 - 63.6}{2.5} = \frac{6.4}{2.5} = 2.56$$

unusual  
b/c  $> 2$  SD.  
from mean

14. Three students take equivalent stress tests. Which is the highest relative score (meaning which has the largest z score value)?

- a. A score of 144 on a test with a mean of 128 and a standard deviation of 34.

$$z = \frac{144 - 128}{34} = \frac{16}{34} = .47$$

- b. A score of 90 on a test with a mean of 86 and a standard deviation of 18.

$$z = \frac{90 - 86}{18} = \frac{4}{18} = .22$$

- c. A score of 18 on a test with a mean of 15 and a standard deviation of 5.

$$z = \frac{18 - 15}{5} = \frac{3}{5} = .6$$

Homework:

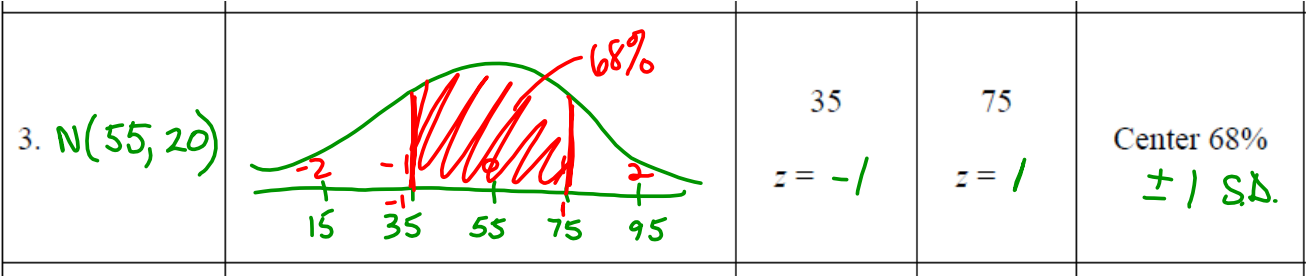
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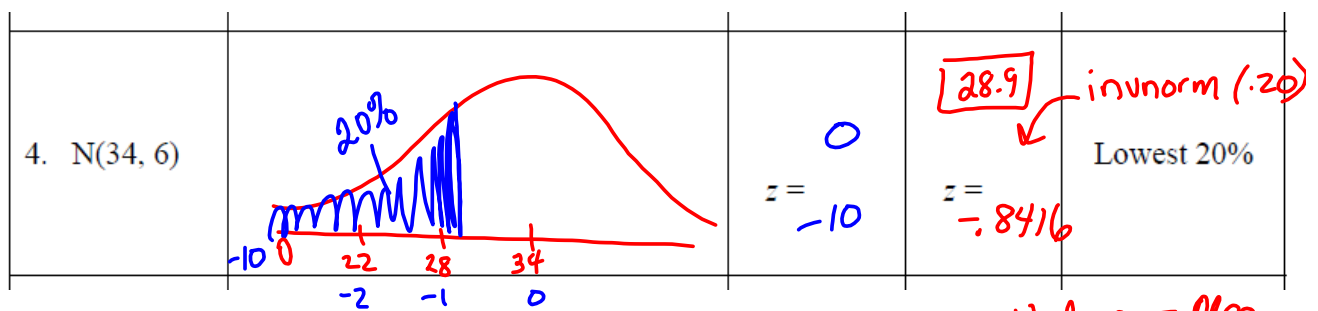
Name \_\_\_\_\_

Statistics Chapter 5: Normal Practice 2

Fill in the missing cell in each row. The first row is complete.

Normal Model	Sketch	Left cutpoint and $z$ -score	Right cutpoint and $z$ -score	Percentage
<div>mean s.d. ↓ ↓ N(5.7, 1.3)</div>		<div>4 value <math>z = -1.31</math></div>	<div>5 <math>z = -.54</math> formula</div>	<div>normalcdf 20.0%</div>





$$z = \frac{\text{Value} - \text{Mean}}{\text{SD}}$$

$$-0.8416 = \frac{x - 34}{6}$$

$$-5.05 = x - 34$$

$$28.9 = x$$