AFM Unit 2 Statistics Name: Key

Normal Distribution Practice Worksheet

For each question, construct a normal distribution curve and label the horizontal axis. Then answer each question.

1. A line up for tickets to a local concert had an average (mean) waiting time of 20 minutes with a standard deviation of 4 minutes.

a) What percentage of the people in line waited for more than 28 minutes?

normal cdf (28, 9999, 20, 4)

2.3%

b) If 2000 ticket buyers were in line, how many of them would expect to wait for less than 16 minutes?

normalcdf (-9999, 16, 20, 4)

0.1586(2000) = 317.3 tickets

2. On a recent math test, the mean score was 75 and the standard deviation was 5. Mike made 93.

a) What is the 25th percentile for the math scores (remember, this is the same as Q_1)?

cannot do without z score chart

b) What is the 75th percentile for the math scores (remember, this is the same as Q_3)?

c) Using the values you found in parts (a) and (b) determine if Mike's score is an outlier.

34 36 38 40 42 44 46

3. In an Oreo factory, the mean mass of a cookie is given as 40 g. For quality control, the standard deviation is 2 g.

a) If 10,000 cookies were produced, how many cookies are within 2 g of the mean?

68% of the cookies are within 2g of the mean so

0.68(10,000) = 6800 cookies

b) Cookies are rejected if they weigh more than 44 g or less than 36 g. How many cookies would you expect to be rejected in a sample of 10,000 cookies?

normal cdf (36, 44, 40, 2) = 0.95

0.95(10,000) = 9500

10,000 - 9500 = 500 cookies

4. The speeds of cars on the highway have a mean of 95 km/h with a standard deviation of 5 km/h.

a) What percentage of cars averaged less than 85 km/h?

normal cdf (-9999, 85, 95, 5)

2.3%

b) If a police car stopped cars that were going more than 105 km/h, how many cars would they stop if there were 8000 cars on the highway?

normal cdf (105, 9999, 95, 5)

0.023(8000) = 182 cars

5. The Floppy Disk Company makes 3.5 inch floppy disks for disk drives that are 3.7 inches wide. The width of a manufactures disk is normally distributed with a standard deviation of 0.1 inches. The company manufactures 1000 disks every hour.

a) 45% of the disks are wider than how many inches?

b) In one hour, how many disks would you expect to be between 3.4 inches and 3.7 inches?

normalcdf(3.4, 3.7, 3.7, 0.1)

0.4986(1000) = 498.6 disks

c) About 2.3% of disks are wider than what width?

6. The mean life of a battery is 50 hours with a standard deviation of 6 hours. The manufacturer advertises that they will replace all batteries that last less than 38 hours. If 50,000 batteries were produced, how many would they expect to replace?

normalcdf(-9999, 38, 50, 6)

0.02275(50,000) = 1137.5 batteries

7. A bottle of fruit punch contains at least 473 ml. The machine that fills the bottles is set so that the mean volume is 477 ml. The volumes in the bottles are normally distributed.

a) What percent of the bottles are under-filled if the standard deviation is 2 ml?

normalcdf(473, 9999, 477, 2) 2.3%

1 - 0.977 = 0.02275

b) What percent of the bottles are under-filled if the standard deviation is 4 ml?

normalcdf(473, 9999, 477, 4)

1 - 0.841 = 0.1586 15.9%

8. A grading scale is set up for 1000 students' test scores. It is assumed that the scores are normally distributed with a mean score of 75 and a standard deviation of 15

a) How many students will have scores between 45 and 75?

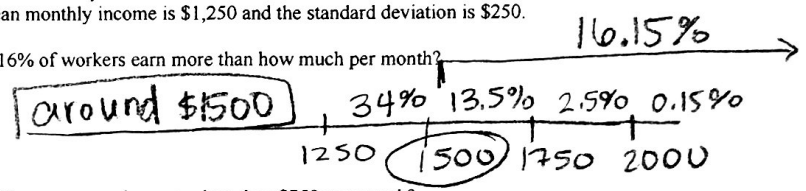
normalcdf(45, 75, 75, 15) =

0.4772(1000) = 477.2 students

b) If 84.1% of students pass the test, what was the minimum passing score?

9. The monthly income of 5,000 workers at the Microsoft plant are distributed normally. Suppose the mean monthly income is $1,250 and the standard deviation is $250.

a) 16% of workers earn more than how much per month?



b) How many workers earn less than $750 per month?

normalcdf(-9999, 750, 1250, 250)

0.0227(5000) = 113.7 workers

c) What percentage of the workers earn between $750 and $1500 per month? ~~4,050~~

normalcdf(750, 1500, 1250, 250)

0.8185 → 81.9%

d) 97.7% of workers earn less than how much per month?