Advanced Algebra
Normal Distributions WS 3

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Non-Standard Normal Distribution

For each question, draw a sketch and find each probability.

1. According to a survey conducted by television advertisers, the average adult American watches an average of 6.98 hours of television per day. The data is normally distributed with a standard deviation of 3.80 hours. Find the probability that a randomly selected person watches more than 8.00 hours of television per day.

$$z = \frac{8 - 6.98}{3.8} = 0.27 \qquad 1 - 0.6064 = \underline{0.3936}$$

6.98

2. Insurance companies have determined that US males between the ages of 16 and 24 drive an average of 10,718 miles each year with a standard deviation of 3763 miles. Assume the data is normally distributed. For a randomly selected male in that age group, find the probability that he drives less than 12,000 miles per year.

$$z = \frac{12000 - 10,718}{3763} = 0.34 \qquad \underline{0.6331}$$

$\overline{x}$
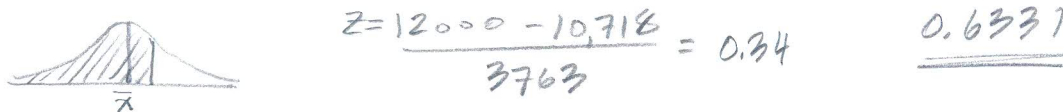
3. A company that manufactures sleeping bags says that the average amount of down in an adult sleeping bag is 32 ounces with a standard deviation of 0.9 ounces. What is the probability that a bag chosen at random has more than 33.2 ounces of down?

$$z = \frac{33.2 - 32}{0.9} = 1.33 \qquad 1 - 0.9082 = \underline{0.0918}$$

32
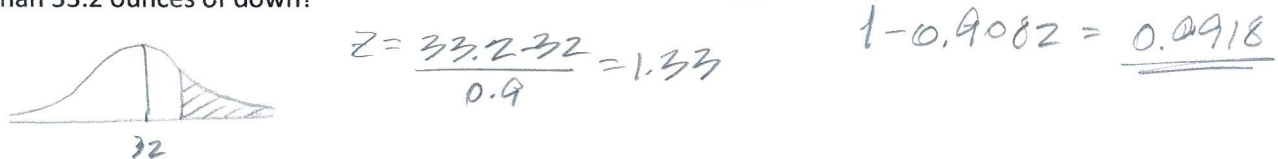
4. The heights of six-year old girls are normally distributed with a mean of 117.80 cm and a standard deviation of 5.52 cm. Find the probability that a randomly selected six-year old girl has a height between 117.80 cm and 120.56 cm.

$$z = \frac{120.56 - 117.80}{5.52} = 0.5 \qquad 0.6915 - 0.5 = \underline{0.1915}$$

$\overline{x}$

5. The average heating bill for a residential area is $123 for the month of November with a standard deviation of $8. If the amount of the heating bills are normally distributed, find the probability that the average bill for a randomly selected resident is more than $125.

$$z = \frac{125 - 123}{8} = 0.25 \qquad 1 - 0.5987 = \underline{0.4013}$$

X
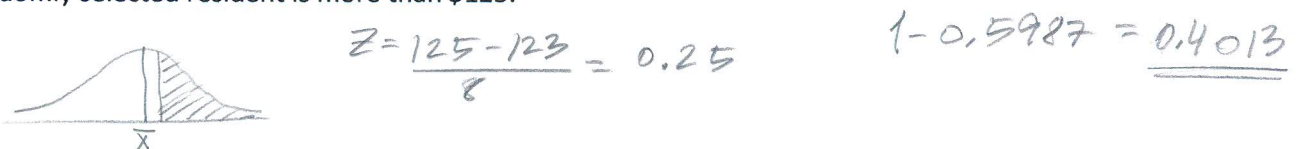
6. An IQ test has a mean of 100 with a standard deviation of 15. What is the probability that a randomly selected adult has an IQ between 85 and 115?

$$z_1 = \frac{85 - 100}{15} = -1 \qquad 0.8413 - 0.1587$$
$$z_2 = 1 \qquad\qquad = \underline{0.6826}$$

85 100 115
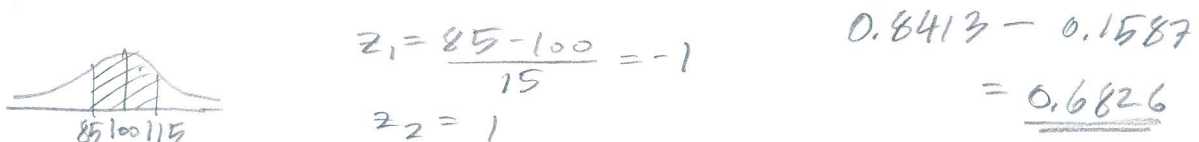
7. The average adult spends 5 hours per week on a home computer, with a standard deviation of 1 hour. What percent of adults spend more than 6 hours per week on their home computer?

$$z = \frac{6 - 5}{1} = 1 \qquad 1 - 0.8413 = 0.1587 \rightarrow \underline{15.87\%}$$

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