

For each of the following, sketch a normal distribution. Then, find the probabilities of z scores being greater or less than the values indicated.

1

$p(z > 1.00)$ $p(z > .80)$ $p(z < -0.25)$ $p(z < -1.25)$



Lice are a pesky problem for school aged children and is unrelated to cleanliness. The lifetimes of lice that have fallen off the scalp onto bedding is approximately normally distributed with a mean of 2.2 days and a standard deviation of 0.4 days.

Find the proportion of a normal distribution that is located

2

- Between $z = -0.50$ and $z = 0.50$
- Between $z = -1.00$ and $z = 1.00$
- Between $z = -1.50$ and $z = 0$
- Between $z = -0.25$ and $z = 1.75$

For a normal distribution, find the z-score values that border:

- The middle 60% of the distribution
- The middle 70% of the distribution
- The middle 80% of the distribution
- The deviant 10% of the distribution
- The deviant 5% of the distribution

3

A normal distribution has $M = 80$ and $s = 20$. Find the following probabilities:

$p(X > 85)$ $p(X < 70)$
 $p(X < 92)$ $p(X > 64)$

4

The width of the index finger of a human right hand is normally distributed with a mean of 6 cm. and a standard deviation of 0.5 cm.



- What percentage of people have index fingers wider than 6.80 cm?
- What is the percentile rank of someone with a finger width of 5.6 cm?
- What is the probability that the finger width of a randomly selected person will be between 5 cm. and 7.5 cm.?

5

- Within how many days can we expect 15% of the lice to die?
- Within how many days can we expect 90% of the lice to die?
- Find the lifespan of lice that form the boundaries for the middle 70% of the distribution.

6

IQ scores are designed to have a mean of 100 and a standard deviation of 15. IQ testing is one way in which individuals are categorized as having different levels of mental disabilities; there are four levels of mental retardation between the IQ scores of 0 and 70.

- ⇒ People with IQ scores of 20-35 are said to have severe mental retardation and can learn only basic skills (e.g. how to talk, basic self-care). What are the z scores for a raw score of 20 and a raw score of 35?
- ⇒ People with IQ scores of 50-70 are in the topmost category of IQ scores that qualify as impairment. They are said to have mild mental retardation. They can attain as high as a sixth-grade education and are often self-sufficient. What percentage of people fall in this range?
- ⇒ An individual has an IQ of 66. What is her percentile?
- ⇒ An individual falls at the 3rd percentile. What is his IQ score? Would he be classified as having a mental disability?

7

A consumer survey indicates that the average household spends an average of \$155 on groceries each week. The distribution of spending amounts is approximately normal with a standard deviation of \$25. Based on this distribution,

- What proportion of the population spends more than \$175 per week on groceries?
- How much money do you need to spend on groceries each week to be in the top 10% of the distribution?
- How much does your family spend per week on groceries? What is your family's percentile rank?

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