

Review for 6.2, 6.3, 6.5
College Prep Statistics

Name: _____

1. A radar unit is used to measure speeds of cars on a motorway. The speeds are normally distributed with a mean of 90 km/hr and a standard deviation of 10 km/hr. What is the probability that a car picked at random is travelling at more than 100 km/hr?

2. For a certain type of computers, the length of time between charges of the battery is normally distributed with a mean of 50 hours and a standard deviation of 15 hours. John owns one of these computers and wants to know that probability that the length of time will be between 50 and 70 hours.

3. Entry to a certain university is determined by a national test. The scores on this test are normally distributed with a mean of 500 and a standard deviation of 100. Tom wants to be admitted to this university and he knows that he must score better than at least 70% of the students who took the test. Tom takes the test and scores 585. Will he be admitted to this university?

4. The length of similar components produced by a company is approximated by a normal distribution model with a mean of 5 cm and a standard deviation of 0.02 cm. If a component is chosen at random,

a) what is the probability that the length of this component is between 4.98 and 5.02 cm?

b) what is the probability that the length of this component is between 4.96 and 5.04 cm?

5. The length of life of an instrument produced by a machine has a normal distribution with a mean of 12 months and standard deviation of 2 months. Find the probability that an instrument produced by this machine will last:

a) less than 7 months.

b) between 7 and 12 months.

6. A packing plant fills bags with cement. The weight (X kg) of a bag of cement can be modeled by a normal distribution with mean 50 kg and standard deviation 2 kg.

a) Find $P(X > 53)$.

b) Find the weight that is exceeded by 99% of the bags.

c) Three bags are selected at random. Find the probability that two weigh more than 53 kg and one weighs less than 53 kg.

7. The random variable X has a normal distribution with mean 20 and standard deviation 4.

a) Find $P(X > 25)$.

b) Find the value of d such that $P(20 < X < d) = 0.4641$.

8. The measure of intelligence, IQ, of a group of students is assumed to be normally distributed with mean 100 and standard deviation 15.

a) Find the probability that a student selected at random has an IQ less than 91.

b) The probability that a randomly selected student has an IQ of at least $100 + k$ is 0.2090. Find, to the nearest whole number, the value of k .

9. The heights of a group of athletes are modeled by a normal distribution with mean 180 cm and standard deviation 5.2 cm. The weights of this group of athletes are modeled by a normal distribution with mean 85 kg and standard deviation 7.1 kg. Find the probability that a randomly chosen athlete:

a) is taller than 188 cm.

b) weighs less than 97 kg.

c) Assuming that height and weight are independent for these athletes, find the probability that a randomly chosen athlete is taller than 188 cm and weighs more than 97 kg.

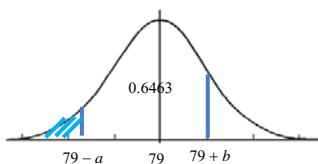
10. A scientist found that the time taken, M minutes, to carry out an experiment can be modeled by a normal random variable with mean 155 minutes and standard deviation 3.5 minutes. Find

(a) $P(M > 160)$

(b) $P(150 < M < 157)$

(c) the value of m , to 1 decimal place, such that $P(M < m) = 0.30$

11. It is known that $P(79 - a < X < 79 + b) = 0.6463$. This information is shown in the figure below:



Given that $P(X > 79 + b) = 2P(X < 79 - a)$, find the area of the shaded region.

12. A health club lets members use, on each visit, its facilities for as long as they wish. The club's records suggest that the length of a visit can be modeled by a normal distribution with mean 90 minutes. Only 20% of members stay for more than 125 minutes.

(a) Find the standard deviation of the normal distribution.

(b) Find the probability that a visit lasts less than 25 minutes.

~~13. Strips of metal are cut the length L cm, where the length L follows the normal distribution with mean μ cm and standard deviation 0.5 cm.~~

~~(a) Given that 2.5% of the cut length exceed 50.98 cm, find μ .~~

~~(b) Find $P(49.25 < L < 50.75)$.~~

~~(c) Those strips with length less than 49.25 cm or greater than 50.75 cm cannot be used. Two strips of metal are selected at random. Find the probability that both strips cannot be used.~~