Math 3   Name _____

Normal Distributions   Date _____ Per _____

1. The batting average for major league baseball is an approximately normal distribution with a mean of 0.261 and a standard deviation of 0.034.

    a. What percentage of batting averages are between 0.193 and 0.329?

    b. What percentage of values are less than 0.227?

    c. If a player hit 0.295 what is his percentile rank?

2. College GPA's are approximately normally distributed with a mean of 2.85 and a standard deviation of 0.2.

    a. What would the GPA be for a student who is in the 16th percentile?

    b. What GPA would a student have if they are in the top 2.5% of their class?

    c. What percentage of students have a GPA above 3.05?

3. X is a normally distributed variable with a mean $\mu = 30$ and standard deviation $\sigma = 4$. Find the probability of each and include a sketch to represent your answer.

a. P(x < 40)

b. P(x > 21)

c. P(30 < x < 35)

4. A radar unit is used to measure speeds of car 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 traveling at more than 100 km/hr?

5. Entry to a certain University is determined by a national test. The score on this test are normally distributed with a mean of 500 and a standard deviation of 100. Tom want 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?

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

a. less than 7 months

b. Between 12 and 7 months

7. The length of similar components produced by a company are 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 the component is between 4.96 and 5.04 cm?

8. The time taken to assemble a car in a certain plant is a random variable having a normal distribution of 20 hours and a standard deviation of 2 hours. What is the probability that a car can be assembled at this plant in a period of time

a. Less than 19.5 hours?

b. Between 20 and 22 hours?

9. A large group of students took a test in Physics and the final grades have a mean of 70 and a standard deviation of 10. If we can approximate the distribution of these grades by a normal distribution, what percent of the students

a. Scored higher than 80?

b. Should pass the test (grades $\geq$ 60)?

c. Should fail the test (grades < 60)?

10. The annual salaries of employees in a large company are approximately normally distributed with a mean of $50,000 and a standard deviation of $20,000.

a. What percent of people earn less than $40,000?

b. What percent of people earn between $45,000 and $65,000?

c. What percent of people earn more than $70,000?