

Analysis
The Standard Normal Distribution

Name: _____

Hour: _____

1. What is the area under the normal curve to the left of a z value of -1.96 ?
2. What is the area under the normal curve to the left of a z value of 0.87 ?
3. What is the area under the normal curve to the right of a value of 1.42 ?
4. What is the area under the normal curve between vertical lines at $z = -1.73$ and $z = 2.45$?
5. What is the area under the normal curve between a z value -1.54 and a z value of -0.76 ?
6. Find the value of z such that the area under the normal curve to the left of z is 0.4370 ?
7. Find the value of z such that the area under the normal curve to the right of z is 0.4808 ?
8. Ninety percent of the normal curve lies to the left of a particular z -score. What is the value of that score?
9. If x is a normally distributed variable with mean of 24 and a standard deviation of 3 , what's the z -score that corresponds to an x value of 19 ?
10. If x is a normally distributed variable with mean of 100 and a standard deviation of 15 , find the probability for $70 < x < 130$.
11. For a certain IQ test, results are normally distributed with mean of 100 points and standard deviation of 15 points. What is the probability that a person chosen at random will have an IQ score between 70 and 130 ?
12. Scores for a particular civil service exam are normally distributed with mean of 137 points and a standard deviation of 17.2 points. Applications for civil service jobs must take this test, and the top 10% can be offered jobs. What is the cutoff score that separates the highest 10% of the test scores from the others?
13. The time it takes members of the track team at Fasttrack University to run a 1 -mile course is normally distributed with mean of 5.6 minutes and a standard deviation of 0.76 minutes. The coach has decided that the fastest 10% of the team who can run the course in the least time will be sent to participate in a national track meet. What is the cutoff score that will decide which members of the team will qualify?

14. The playing time (x) of jazz CDs has the normal distribution with mean 52 and standard deviation 7.
- According to the Empirical Rule, what percentage of jazz CDs play between 45 and 59 minutes?
 - What is the relative frequency of jazz CDs with playing time, x , less than 40 minutes?
 - What is the relative frequency of jazz CDs with playing time over 1 hour?
15. The playing time x of classical CDs has the normal distribution with mean 54 and standard deviation 5.
- What is the relative frequency of classical CDs with playing time, x , less than 40 minutes?
 - What relative frequency of classical CDs have playing time over 1 hour?
 - What is the relative frequency of classical CDs with playing time between 45 and 59 minutes?
16. SAT (combined) scores of college-bound seniors in high school has the normal distribution with mean 1050 and standard deviation 150.
- What is the relative frequency college-bound seniors who have SAT score, x , less than 756?
 - Find the value, x , such that the 0.025 of all seniors have SAT score below x .
 - Find the value, x , such that the 0.20 of all seniors have SAT score below x .
 - What are the 4th and 20th percentiles of this distribution?
 - What is the 97th percentile?
17. The Graduate Record Examination (GRE) is widely used to help predict the performance of applicants to graduate school. The range of possible scores on a GRE is 200 to 900. The math department at a university finds that the scores of its applicants on the verbal portion of the GRE (VGRE) are approximately normal with mean $\mu = 612$ and standard deviation $\sigma = 103$. If we select an applicant file at random, find...
- The probability VGRE exceeds 800.
 - The probability VGRE is between 400 and 800.
 - The value x such that 10% of applicants score below x .

18. The length of human pregnancies from conception to birth varies according to a distribution that is approximately normal with mean 264 days and standard deviation 16 days.

a. What's the probability a pregnancy lasts less than 250 days?

b. What's the probability a pregnancy lasts between 240 and 270 days?

c. Doctors agree that serious thought to labor-inducing procedures ought to accompany any pregnancy that runs in the longest 2% of all pregnancies. At what day should these procedures be considered?

19. The rate of return on stock indexes (which combine many individual stocks) is approximately normal. Since the Standard and 1945, Poor's 500 index has had a mean yearly return of about 12%, with a standard deviation of about 16.5%. Assume the normal distribution is the distribution of yearly returns over a long period.

a. In what range do the middle 95% of all yearly returns lie? The middle 68%?

b. The market is down for the year if the return on the index is less than zero. What is the probability the market will be down for a random year?

c. What is the probability the index gains 25% or more in a year?

