Functions, Statistics, and Trigonometry

11-8 Lesson Master

Skills Objective A
1. In 1-4, evaluate the given probabilities given $P(z < 2.00) = 0.9772$.
   - $P(z < 2.00) \approx 0.9772$
   - $P(z < 2.58) \approx 0.9950$
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2. In 5-7, determine the standard normal distribution and $a$ is the mean, $\sigma$ is the standard deviation.
   - $P(z < a) = 0.10$ when $a = 1.28$.
   - $P(z < a) = 0.95$ when $a = 1.645$
   - $P(z < a) = 0.05$ when $a = 1.645$
   - $P(z < a) = 0.95$ when $a = 1.645$

Properties Objective B
1. $P(z < a) = a = 0$
2. $P(z > a) = 1 - P(z < a)$
3. $P(z < a) = P(z > -a)$
4. $P(z < a) = $ area under the standard normal curve equals $z$.

Representations Objective C
- In 11-13, refer to the standard normal curve graphed below. The area under the standard normal curve equals $r$. Express each of the following in terms of $r$.
   - $P(z < a) = 0.5$
   - $P(z > a) = 0.5$
   - $P(z < a) = 0.25$
   - $P(z > a) = 0.75$

11-1 Lesson Master

Vocabulary Objective B
1. The standard normal distribution is a normal distribution with mean $\mu = 0$ and standard deviation $\sigma = 1$. The area under the standard normal curve is approximately $0.6826$, $0.9544$, and $0.9974$ for $z$ values in the interval $(-1, 1)$, $(1, 2)$, and $(2, 3)$, respectively.

Properties Objective B
1. The standard normal distribution is even, with $\frac{1}{\sqrt{2\pi}} \approx 0.3989$.
2. The area between the parent normal curve and the $x$-axis is $\pi$.
3. The area between the parent normal curve and the $x$-axis is $\pi$.
4. The probability of rolling a 3 in 15 tosses is $0.00016$.
5. The probability of rolling a 3 in 15 tosses is $0.00016$.
6. The graph of the standard normal curve has inflection points when $z = 0$ and $z = \pm 1.645$.
7. The parent normal curve changes concavity at $z = \pm 2.58$.

11-3 Lesson Master

Properties Objective B
1. The standard normal distribution is a normal distribution with mean $51$ and standard deviation $10$.

2. What conditions need to be met in order to approximate a binomial distribution with a normal distribution?
   - Both $np$ and $n(1 - p)$ must be at least 10.

Uses Objective D
1. A conservatory agency reports that American bald eagles wingspan is normally distributed with mean 170 inches and standard deviation 15 inches. If an American bald eagle is chosen at random what is the probability that
   - the eagle has a wingspan greater than 180 inches? $0.0062$.
   - the eagle has a wingspan between 70 and 80 inches? $0.8185$.

4. Reaction time in a particular psychological experiment is measured by how quickly a participant presses the space bar on a keyboard. Historically, this experiment has been normally distributed with mean reaction time of 0.62 seconds and standard deviation of 0.20 seconds. Find the percent of participants you would expect to take no longer than 0.55 seconds to respond.
   - $61.0\%$

5. The human eye blinks at different rates depending on such factors as age, stress level and nervousness when someone is talking. Some diseases such as Tourette syndrome have been seen to affect the rate of blinks per minute for an individual. Suppose that the mean blinks per minute for an adult and infant are both normally distributed with mean 15.6 and 3.2 blinks per minute, respectively. The standard deviation for adults and infants is 4.3 and 0.9 blinks per minute, respectively. Find the probability that
   - a randomly selected adult blinks at least 5 times per minute. $0.0228$
   - a randomly selected adult blinks no more than 20 times in a minute. $0.9980$