

Math 80 HW#5
Due Weds April 25th

1. Do as indicated

Suppose a random variable, x , arises from a binomial experiment. If $n = 10$, and $p = 0.70$, find the following probabilities using technology.

- a.) $P(x = 2)$
- b.) $P(x = 8)$
- c.) $P(x = 7)$
- d.) $P(x \leq 3)$
- e.) $P(x \geq 7)$
- f.) $P(x \leq 4)$

2. Do as indicated

Approximately 10% of all people are left-handed ("11 little-known facts," 2013). Consider a grouping of fifteen people.

- a.) State the random variable.
 - b.) Argue that this is a binomial experiment
- Find the probability that
- c.) None are left-handed.
 - d.) Seven are left-handed.
 - e.) At least two are left-handed.
 - f.) At most three are left-handed.
 - g.) At least seven are left-handed.
 - h.) Seven of the last 15 U.S. Presidents were left-handed. Is this unusual? What does that tell you?

3. Do as indicated

Suppose a random variable, x , arises from a binomial experiment. Suppose $n = 7$, and $p = 0.50$.

- a.) Write the probability distribution.
- b.) Draw a histogram.
- c.) Describe the shape of the histogram.
- d.) Find the mean.
- e.) Find the variance.
- f.) Find the standard deviation.

4. Do as indicated

Find each of the probabilities, where z is a z -score from the standard normal distribution with mean of $\mu = 0$ and standard deviation $\sigma = 1$. Make sure you draw a picture for each problem.

- a.) $P(z < 2.36)$
- b.) $P(z > 0.67)$
- c.) $P(0 < z < 2.11)$
- d.) $P(-2.78 < z < 1.97)$

5. Do as indicated

The size of fish is very important to commercial fishing. A study conducted in 2012 found the length of Atlantic cod caught in nets in Karlskrona to have a mean of 49.9 cm and a standard deviation of 3.74 cm (Ovegard, Berndt & Lunneryd, 2012). Assume the length of fish is normally distributed.

- a.) State the random variable.
- b.) Find the probability that an Atlantic cod has a length less than 52 cm.
- c.) Find the probability that an Atlantic cod has a length of more than 74 cm.
- d.) Find the probability that an Atlantic cod has a length between 40.5 and 57.5 cm.
- e.) If you found an Atlantic cod to have a length of more than 74 cm, what could you conclude?
- f.) What length are 15% of all Atlantic cod longer than?

6. Do as indicated

Eyeglassomatic manufactures eyeglasses for different retailers. They test to see how many defective lenses they made in a given time period and found that 11% of all lenses had defects of some type. Looking at the type of defects, they found in a three-month time period that out of 34,641 defective lenses, 5865 were due to scratches. Are there more defects from scratches than from all other causes?

State the type I and type II errors in this case, consequences of each error type for this situation from the perspective of the manufacturer, and the appropriate alpha level to use. State why you picked this alpha level.

7. Do as indicated

In July of 1997, Australians were asked if they thought unemployment would increase, and 47% thought that it would increase. In November of 1997, they were asked again. At that time 284 out of 631 said that they thought unemployment would increase ("Morgan gallup poll," 2013). At the 5% level, is there enough evidence to show that the proportion of Australians in November 1997 who believe unemployment would increase is less than the proportion who felt it would increase in July 1997?