STAT 157 – Test 3

April 14, 2020 **Name:** Solution Set

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Total: 15 points

1. (7 points) The time it takes to boot my Microsoft Surface Pro 4 has a mean of 8.1 seconds and a standard deviation of 0.4 seconds. Assume that the boot time is normally distributed.

   (a) Twelve percent of the time, the Surface takes longer than a certain time to boot. Calculate that time.

(2) area = 0.12

using online calculator, $t = 8.57$ seconds

   (b) Find the probability that the next time I boot my Surface Pro, that it takes under 7.2 seconds.

(2) want $t < 7.2$ seconds

using online calculator, $p = 0.0121999$

$= 1.2\%$

   (c) Find the probability that the next time I boot my Surface Pro, that it takes at least 8.1 seconds.

(1) want $t \geq$ mean

$p = 0.5$

$= 50\%$

   (d) Even if you didn't have an online calculator, you should be able to calculate the answer to (c) in your head. What two properties of the normal distribution allow you to do that? Be brief!

(2)
- curve is symmetrical
- total area under the curve = one or 100%

(so half is 50%)

2. (6 points) A random sample of seventy-five Greater Victoria Public Library patrons showed that when they checked out an ebook, the time of the loan had a mean of 205 hours with a standard deviation of 52 hours.

   (a) Find a 98% condence interval for the mean time for these ebook loans.

$$\mu = \bar{x} \pm \frac{z\sigma}{\sqrt{n}}$$

$$= 205 \pm \frac{2.326(52)}{\sqrt{75}} \qquad (2.33 \text{ also fine})$$

$$= 205 \pm 14.06$$

CI = 191 to 219 hours

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   (b) What would happen to the width of the confidence interval in part (a) if you were to increase your sample size? Explain your reasoning briefly.

the width would be smaller because $\sqrt{n}$ is in the denominator

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3. (2 points) You have just bought a new sparkly four-sided die, and the manufacturer claims that the probabilities of each roll can be found in the following table. Unfortunately, the table is smudged and you can't read the last entry.

x	$p(x)$
1	0.2
2	0.2
3	0.2
4	$y = 0.4$

(a) Calculate the missing value in the table.

$$\Sigma p(x) = 1 = 0.2 + 0.2 + 0.2 + y$$

$$y = 0.4$$

(b) Is this die fair? Explain briefly.

no, because the rolls are not equally likely