

STAT 157 – Practice Test 3

Winter 2020
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Name: Solution Set

Total: 15 points

1. (6 points) The mean price for a barrel of crude oil in July 2014 was \$105. Let's assume that the price is normally distributed with a standard deviation of \$8.

(a) Find the probability that the price for a barrel of crude oil is above \$100.

$$\begin{aligned} \text{mean} &= 105 \\ \text{std dev} &= 8 \end{aligned}$$

2

$$\text{want } x > 100$$

$$\text{so } P = 0.734$$

$$= 73.4\%$$

(b) Find the probability that the price for a barrel of crude oil is between \$90 and \$100.

$$\text{same mean, std dev}$$

$$\text{but want } 90 < x < 100$$

2

$$P = 0.2356$$

$$= 23.56\%$$

(c) 99.5% of the time, the price is above a certain amount. Calculate that amount.

$$\text{area} = 0.995$$

2

$$x = 89.393$$

$$= \$89.39$$

2. (6 points) A random sample of 60 cans of Coke had an average volume of 355.3 mL and a standard deviation of 2.5 mL.
- (a) Find a 95% confidence interval for the average volume among all cans of Coke.

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

for large samples, okay to
swap s for σ

$$\text{for } 95\%, z = 1.96$$

$$\mu = 355.3 \pm \frac{1.96(2.5)}{\sqrt{60}}$$

$$= 355.3 \pm 0.632587$$

(4)

$$\text{CI} = 354.7 \text{ mL to } 355.9 \text{ mL}$$

- (b) Would a 99% confidence interval be wider or narrower than the 95% confidence interval in part (a)? Explain your reasoning briefly.

wider, because $z = 2.576$ (higher value)

for 99% CI

(2)

3. (3 points) Consider the following table

x	$p(x)$
-5	0.15
-2	0.2
1	0.4
6	0.25

(a) Is the variable x discrete or continuous?

①

discrete, because there are only
4 possible values of x

(b) Is this table a valid probability distribution? Explain your reasoning briefly.

②

yes, because $\sum p(x) = 0.15 + 0.2 + 0.4 + 0.25$
 $= 1$