STAT 1030 Exam 2 In-class Practice Questions Wednesday Week 10

DIRECTIONS:

- Actual Exam 2 questions will <u>differ</u> from these practice questions. But the practice questions show the exam *style* and will help you to review some concepts from Topics 4–6.
- Practice questions do not substitute for Homework in exam preparation.
- Additional Exam 2 Practice Questions are available as a PDF file on the Exams link from the main Stats website (not ICON.) Answers for those questions are shown on the last page.
- Check answers with TAs during today's class.
- Try to answer <u>all</u> questions associated with each word problem before checking answers.
- You may ALSO use today's class to ask TAs and Prof. Whitten questions about Homeworks 5–8 (covered on Exam 2.)

Questions 1–4.

Customer checkout time at CVS Pharmacy in the Old Capitol Mall is uniformly distributed between 0.6 and 2.4 minutes. The checkout time at Walgreens Drug on 2nd Street in Coralville is normally distributed with a mean of 102 seconds and standard deviation 30 seconds.

1. Which store checks customers out more quickly on average?

(a) CVS (b) Walgreens

2. Which store has a greater tendency to keep customers waiting in the checkout line more than two minutes?

(a) CVS (b) Walgreens

3. Only 10% of all customers at CVS require more than t_1 minutes to check out. Find t_1 .

(a) 0.78 (b) 1.06 (c) 2.22 (d) 2.34 (e) None of the answers is correct to the second decimal place

4. Only 10% of all customers at Walgreens require more than t_2 minutes to check out. Find t_2 . (a) 0.78 (b) 1.06 (c) 2.22 (d) 2.34 (e) None of the answers is correct

to the second decimal place

(next page blank)

(blank)

Questions 5–7.

A soft-drink machine dispenses soft drink into an eight-ounce cup. The amount dispensed into different cups is never quite the same. In fact, the amount is normally-distributed with mean μ and standard deviation equal to 0.3 ounces. The "average setting" μ can be adjusted to any positive value.

- 5. If μ is set at eight ounces, what percentage of cups will overflow with soft drink? (a) 0 (b) 100 (c) 22 (d) 74 (e) None of the answers is correct.
- 6. Find the setting for μ so that only 5% of cups overflow.
 - (a) 9.65 ounces (b) 7.51 ounces (c) 8.49 ounces (d) 6.35 ounces
 - (e) None of the answers is correct to the second decimal place
- 7. Find the setting for μ so that only 10% of cups are less than full.
 - (a) 8.38 ounces (b) 6.72 ounces (c) 7.62 ounces (d) 9.28 ounces
 - (e) None of the answers is correct to the second decimal place

Question 8.

A 500-page book contains 250 sheets of paper. The thickness of the paper used to manufacture the book has mean 0.08 millimeters (mm) and standard deviation 0.01 mm.

8. What's the probability that a randomly-chosen book is more than 20.2 mm thick (not including the covers)?

(a) 0.104 (b) 0.326 (c) 0.000 (d) 1.000 (e) 0.041

Questions 9–10.

A certain manufacturing process produces electronic parts, 20% of which are defective. Parts are shipped in units of 400. Shipments containing 90 or more defective parts are returned for a refund.

9. What's the probability that a given shipment will be returned?

(a) 1.0000 (b) 0.0000 (c) 0.1056 (d) 0.8944 (e) None of the answers is correct to the fourth decimal place

10. On a particular day, 500 shipments are made. What is the probability that 60 or more of these shipments are returned?

(a) 0.21 (b) 1.05 (c) 0.15 (d) 0.18 (e) None of the answers is correct to the second decimal place

Questions 11–13.

A manufacturing company ships its product in two different sizes of truck trailers, an $8 \times 10 \times 30$ size and an $8 \times 10 \times 40$ size (all measurements in feet.) 70% of its shipments are made by using the 30-foot trailer and 30% by using the 40-foot trailer,

- 11. Find the mean volume shipped per trailer load, assuming that trailers are always full.
 - (a) 34 (b) 2400 (c) 3200 (d) 100 (e) None of the answers is correct
- 12. If the company receives \$0.55 in revenue for each cubic foot of shipped volume, what's the average revenue per trailer load?

(a) 18.7 (b) 55 (c) 1452 (d) 1320 (e) None of the answers is correct

- 13. Find the standard deviation of revenue per trailer load.
 - (a) \$202 (b) \$367 (c) \$73,920 (d) \$134,400
 - (e) None of the answers is correct to the nearest dollar

Answers



7. (a)



success: shipment returned x = # of returned shipments in a day p = 0.1056 n = 500

$$P(x \ge 60) = P(x/n \ge 60/500) = P(\hat{p} \ge 0.12) = P(Z \ge 1.05) = 0.1469$$

(continued)

11. (e)

Volume = height \times width \times length x = volume per trailer

| x | p(x) | xp(x) |
|------|------|----------------|
| 2400 | 0.70 | 1680 |
| 3200 | 0.30 | 960 |
| | | $\mu_x = 2640$ |

 $\mu_x = 2640$ cubic feet Therefore none of the answers is correct.

12. (c)

y = revenue per trailer

 μ_y = average revenue per trailer = $0.55 \times average$ cubic volume = $0.55 \times 2640 =$ \$1452

13. (a)

There are at least two ways to get the answer:

(1) Use the probability distribution for y:

| | y | p(y) | $y \cdot p(y)$ | μ_y | $(y - \mu_y)$ | $(y-\mu_y)^2$ | $(y-\mu_y)^2 \cdot p(y)$ |
|------------|------------------------|---------|----------------|---------|---------------|---------------|--------------------------|
| | 1320 | 0.70 | 924 | 1452 | -132 | $17,\!424$ | $12,\!196.8$ |
| | 1760 | 0.30 | 528 | 1452 | 308 | $94,\!864$ | $28,\!459.2$ |
| | | | $\mu_y = 1452$ | | | | $\sigma_y^2 = 40,656.0$ |
| \implies | $\sigma_y = \sqrt{40}$ | 0,656 = | = \$201.63 | | | | |

(2) Use the probability distribution for x:

$$\begin{array}{c|cc} x & p(x) \\ \hline 2400 & 0.70 \\ 3200 & 0.30 \\ \end{array}$$

to get

- $\mu_x = 2640$ cubic feet
- $\sigma_x^2 = 134,400$
- $\sigma_x = \sqrt{134,400} = 366.60$ cubic feet

and then use **Rule 1 for Variances** (p. 253 textbook):

$$\sigma_{a+bx}^2 = b^2 \sigma_x^2$$

$$y = 0.55x \text{ so } a = 0 \text{ and } b = 0.55$$

$$\implies \sigma_y^2 = (0.55)^2 \sigma_x^2 = (0.55)^2 (134, 400) = 40,656$$

$$\implies \sigma_y = \sqrt{40,656} = \boxed{\$201.63}$$