Stats for Business Practice Quiz 3

DO NOT TURN QUIZ OVER !!
(until asked to do so)

For maximum benefit, observe exam conditions:

- Write answers yourself (No help from classmates)
- Calculators may not be shared.
- Use pencil/pen and calculator only. (No notes/cellphones)
- You have 15 minutes for quiz. (We review afterward)

Potentially Useful Formulas:

$$P(\text{A or B}) = P(\text{A}) + P(\text{B}) - P(\text{A and B})$$

$$P(\text{A and B}) = P(\text{A}) \cdot P(\text{B}|\text{A})$$

$$P(\text{B}|\text{A}) = P(\text{A and B})/P(\text{A})$$

Stat 1030 Macbride Practice Quiz 3 Use a calculator and pen or pencil only. (No cell phones.)

DIRECTIONS: **You have 15 minutes to complete the quiz.**

(Note: The following word problem is completely fictional!) Suppose that the Associate Dean for the Undergraduate Program Office (UPO) in the Tippie College of Business is seriously concerned about graduation rates for UI business majors. Records show that 72% of students who take longer than five years to graduate take courses in a *different* order than the order recommended by advisors in the UPO!

Alarmed by this statistic, the dean considers issuing a *formal academic warning* to any business major who takes courses in a different order. Records also show that 5% of business majors take longer than five years to graduate and 40% of business majors who graduate in five years or less have taken at least one course in a different order.

1. What's the probability that a student who takes courses in a different order will take longer than five years to graduate?

   (a) 0.0360 (b) 0.0614 (c) 0.3800 (d) 0.4160 (e) None of the answers is correct to the fourth decimal place

2. Does it seem like a good idea for the dean to issue the academic warnings? Explain.

   (a) Yes, since the probability in Question 1 exceeds 5%.
   (b) No, since the probability in Question 1 exceeds 5%.
   (c) Yes, since the probability in Question 1 exceeds 40%.
   (d) No, since the probability in Question 1 exceeds 40%.
   (e) No, since the probability in Question 1 is less than 72%.

(continue work on your own sheet of paper, if you need more space)

Macbride Quiz Announcements

- I post Practice Quiz Solution on the Stats Website after each quiz for easy review. (See Macbride Quiz page.)

- Self-Grading! Now compare your answers to the solution that I show!

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2. Does it seem like a good idea for the dean to issue the academic warnings? Explain.

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   (b) No, since the probability in Question 1 exceeds 5%.
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   (e) No, since the probability in Question 1 is less than 72%.

0.0865

(continue work on your own sheet of paper, if you need more space)

Step 1 (Events)

- A = Longer than five years to graduate
- B = Take courses in a different order

Step 2 (Available Info)

- $P(\ B \mid A\ ) = 0.72$
- $P(A) = 0.05$
- $P(B \mid \overline{A}\ ) = 0.40$

Step 3 (Answers)

- $P(A \mid B\ ) = ?$
-

$$P(A \mid B\ ) = \frac{P(A \text{ and } B)}{P(B)}$$

$$\begin{aligned} P(A \text{ and } B) &= P(A) \cdot P(B \mid A) \\ &= (0.05)(0.72) = 0.036 \end{aligned}$$

$$P(B) = P(A \text{ and } B) + P(\overline{A} \text{ and } B)$$

$$\begin{aligned} P(\overline{A} \text{ and } B) &= P(\overline{A}) \cdot P(B \mid \overline{A}\ ) \\ &= (0.95)(0.40) = 0.38 \end{aligned}$$

$$P(B) = 0.036 + 0.38 = 0.416$$

$$P(A \mid B\ ) = \frac{P(A \text{ and } B)}{P(B)} = \frac{0.036}{0.416} = \boxed{\mathbf{0.0865}}$$