Quiz 2 Solutions

1-10

	V1 - dots	V2 - slash	V3 - dash
1	c	a	e
2	c or d	b or d	a or d
3	d	c	c
4	b	e	c
5	e	e	e
6	b or e	d or e	c or e
7	a	b	e
8	b	c	d
9	d	a	b
10	b	e	b

Instructions given about showing work

"to be eligible for partial credit, your answer must show all of your work and/or explain all of your reasoning"

11

$$\frac{25+29}{26+16+25+29+16+29} = 0.383$$

or, equivalently,

$$\frac{\frac{25+29}{16+25+16+16+29+16+26+16+25+29+16+29}}{\frac{26+16+25+29+16+29}{16+25+16+16+29+16+26+16+25+29+16+29}}$$

Rubric

- 1 - correct
- 0.5 - credit for attempt
- 0.3 - credit for partial attempt (bare minimum attempt)
- 0 - blank/unanswered

12

Let A = eat breakfast and B = floss teeth. Then $Pr(A) = 0.57$, $Pr(B) = 0.80$, and $Pr(A \text{ and } B) = 0.46$.

Hence, $Pr(A \text{ or } B) = Pr(A) + Pr(B) - Pr(A \text{ and } B) = 0.57 + 0.80 - 0.46 = 0.91$

Rubric

- 1 - correct
- 1 - correct but no work shown
- 0.9 - correct work, wrong answer
- 0.5 - correct answer but incorrect work
- 0.6 - incorrect because answer assumes independence
- 0.5 - credit for attempt
- 0.3 - credit for partial attempt
- 0 - blank/unanswered

13

Let A = ticket for speeding and B = ticket for running red light. Then $Pr(A \text{ and } B) = 0.04$, $Pr(A) = 0.12$, and $Pr(B) = 0.09$.

Since $Pr(A \text{ and } B^C) + Pr(A \text{ and } B) = Pr(A)$, we have that $Pr(A \text{ and } B^C) = 0.12 - 0.04 = 0.08$.

Rubric

- 1 - correct
- 0.9 - correct work, wrong answer
- 0.7 - partially correct work
- 0.5 - correct answer but incorrect work
- 0.3 - credit for partial attempt
- 0 - blank/unanswered

14

Assuming independence means either:

$$Pr(\text{Yes HD} \mid \text{Yes Mu}) = Pr(\text{Yes HD})$$

i.e. $\frac{x}{30} = \frac{80}{120}$ meaning $x = 20$, or, equivalently

$$Pr(\text{Yes HD and Yes Mu}) = Pr(\text{Yes HD})Pr(\text{YesMu})$$

i.e. $\frac{x}{120} = \frac{30}{120} \cdot \frac{80}{120}$ meaning $x = 20$.

Rubric

- 1 - correct
- 1 - correct answer, unclear work
- 0.5 - correct answer, incorrect work
- 0.1 - incorrect and no work shown
- 0.3 - incorrect and work shown

- 0.8 - answer incomplete
- 0 - blank/unanswered

15

- $E(X) = 3(0.1) + 4(0.25) + 5(0.55) + 6(0.1) = 4.65$
- $Var(X) = (3 - E(X))^2(0.1) + (4 - E(X))^2(0.25) + (5 - E(X))^2(0.55) + (6 - E(X))^2(0.1) = 0.6284$
- question actually meant that the distribution is for 1 hour shifts and the question asks about 8hr days... so really need to compute $E(8X)$ and $Var(8X)$.... but not grading this way b/c I asked specifically for $E(X)$ and $Var(X)$

Rubric

- 0.1 - found $E(8X)$ and $Var(8X)$ (not necessary but EC perhaps?)
- 0.5 - correct expectation
- 0.5 - correct expectation but no work
- 0.5 - correct variance
- 0.5 - correct variance but no work
- 0.4 - correct variance given incorrect expectation
- 0.4 - correct work for variance but incorrect answer
- 0.4 - answer attempted but incorrect
- 0 - blank/unanswered

16

$X \sim N(5, 2^2)$ so $Pr(X \leq 3.5) = Pr\left(Z \leq \frac{3.5-5}{2}\right) = Pr(Z \leq -0.75) = 0.227$

(give most credit for work, little credit for correct reading of the Z table (since this involves some calculation work))

Rubric

- 1 - correct
- 0.9 - correct z-score
- 0.8 - correct z-score magnitude
- 0.7 - correct picture
- 0.3 - credit for partial attempt
- 0 - blank/unanswered

17

- in words, explain what follows a $Bin(n, p)$ distribution
- define $n = 50$
- define, in words, p

Rubric

- 0.5 - defined a valid probability of success for p
- 0.3 - defined what follows the binomial distribution
- ? - incomplete definition of the variable that follows the binomial distribution
- 0.2 - partial attempt
- 0.2 - defined number of trials/sample size
- 0 - blank/unanswered

18

$X \sim Binom(5, 0.65)$ and we want to find $Pr(X \leq 2) = Pr(X = 0) + Pr(X = 1) + Pr(X = 2) = 0.235$
must display correct usage of binomial table
(Note: $Pr(X = 2) = 0.811$.)

Rubric

- 1 - correct
- 0.8 - correct work, incorrect answer
- 0.7 - incomplete answer (if they found at least $Pr(X = 2)$ and $Pr(X = 1)$)
- 0.5 - correct answer, incorrect work
- 0.5 - credit for attempt (if they just found $Pr(X = 2)$)
- 0.3 - credit for partial attempt
- 0.1 - incorrect answer no work
- 0 - blank/unanswered