
 Question Number

Green	White	Answer
4	1	(A). $P(A \text{ and } B) = P(\text{black ace}) = 2/52$.
5	2	(C). $P(A \text{ or } B^c) = P(\text{ace or red}) = P(\text{red}) + P(\text{black ace}) = 26/52 + 2/52 = 28/52$.
10	3	(C) Take a course. $A = \{\text{pass the course}\}$, $B = \{\text{fail the course}\}$
7	4	(E) The variance of the difference, $X - Y$, is the difference of their variances.
8	5	(B) The distribution of \bar{X} will be highly skewed to the right.
2	6	(D). $\sigma^2 = (1 - 3.83)^2(0.02) + (2 - 3.83)^2(0.03) + (3 - 3.83)^2(0.05) + (4 - 3.83)^2(0.9) = 0.3211 \Rightarrow \sigma = \sqrt{0.3211} = 0.57$.
2	7	(B). $c = 1 - (0.05 + 0.25 + 0.3 + 0.1) = 0.3$. $E[X] = .25 + 2(0.3) + 3(0.3) + 4(0.1) = 2.15$.
3	8	(A). $P(0 < X < 3) = P(1 \leq X \leq 2) = P(X=1) + P(X=2) = 0.25+0.3 = 0.55$.
6	9	(A). $X = \text{gestation period}$. $X \sim N(282,11)$, then $P(X < 258) = P\left(Z < \frac{258-282}{11}\right) = P(Z < -2.18) = 0.0146$ $P(\text{both premature}) = P(X < 258) P(X < 258) = 0.0146^2 = 0.0002$
1	10	(C). Independent.
16	11	(B). $P(\text{found in cafeteria given cell phone lost}) = 0.36/(0.36+0.43) = 0.46$
17	12	(C). $P(\text{tablet}) = 0.06+0.12 = 0.18$. Since devices are randomly selected they are independent of each other. So, $P(\text{both are tablets}) = 0.18^2 = 0.0324$.
9	13	(E). Since C is a subset of B , we have $P(A \cup B \cup C) = P(A) + P(B)$.
12	14	(B). Let $X = \text{number of young adults without a landline out of } n = 100 \text{ young adults}$. Then, $X \sim \text{Binomial}(n = 100, p = 0.75)$. So, $\sigma_X = \sqrt{np(1-p)} = 10\sqrt{0.75(.25)} = 4.33$

Blue	White	Answer (cont'd)
11	15	(A). Let $Y =$ number young adults with a landline out of $n = 12$ young adults. Then, $Y \sim \text{Binomial}(n = 12, p = 0.25)$. Using Table C or computing directly: $P(Y > 10) = P(Y = 11) + P(Y = 12) = 12(.25)^{11}(0.75) + 0.25^{12} \lll 0.001$.
19	16	(B). $P(\bar{X} > 56) = P\left(Z > \frac{56-53.6}{4.8/\sqrt{12}}\right) = P(Z > 1.73) = P(Z < -1.73) = 0.0418$.
20	17	(E). The mean for the total weight of the eggs in a carton is $12(53.6) = 643.2$ g, and the standard deviation is $\sqrt{n}\sigma = \sqrt{12}(4.8) = 16.6$ g.
14	18	(C). Only ii. and iv. are valid binomial settings. The number of trials, n is not fixed in i., and the trials are not independent in iii. since eating habits tend to be correlated within family households.
18	19	(D) Statistical theory tells us that the sum of independent normal random variables is normal.
15	20	20. (C). Let $X =$ income of Spouse 1, and $Y =$ income of Spouse 2. Then $X \sim \mu_X = \$30000$, $\sigma_X = \$5000$ and $Y \sim \mu_Y = \$50000$, $\sigma_Y = \$8000$ and $\rho = 0.55$. Hence, $\sigma_{X+Y} = \sqrt{\sigma_X^2 + \sigma_Y^2 + 2\rho\sigma_X\sigma_Y}$ $= \sqrt{5000^2 + 8000^2 + 2(0.55)(5000)(8000)} = \$11,533$

Answer Key:

QUESTION: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

WHITE: A C C E B D B A A C B C E B A B B C D C

QUESTION: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

GREEN: C C A A C A E D E C A B B C C B C D B E

Midterm2Resp: ‘.’ means you answered correctly,
 a number means you got the question wrong, and
 you submitted the answer given as shown below:

- 1 = A
- 2 = B
- 3 = C
- 4 = D
- 5 = E