

SNAP CHECK August 16 Lesson

Question 1

Let X be a discrete random variable with binomial distribution $X \sim \text{Bi}(n, p)$. The mean and the standard deviation of this distribution are equal.

Given that $0 < p < 1$, the smallest number of trials, n , such that $p \leq 0.01$ is

- A. 37
- B. 49
- C. 98
- D. 99
- E. 101

Question 2

A box contains six red marbles and four blue marbles. Two marbles are drawn from the box, without replacement.

The probability that they are the same colour is

- A. $\frac{1}{2}$
- B. $\frac{28}{45}$
- C. $\frac{7}{15}$
- D. $\frac{3}{5}$
- E. $\frac{1}{3}$

Question 3

The number of pets, X , owned by each student in a large school is a random variable with the following discrete probability distribution.

x	0	1	2	3
$\text{Pr}(X=x)$	0.5	0.25	0.2	0.05

If two students are selected at random, the probability that they own the same number of pets is

- A. 0.3
- B. 0.305
- C. 0.355
- D. 0.405
- E. 0.8

Question 4

The continuous random variable, X , has a probability density function given by

$$f(x) = \begin{cases} \frac{1}{4} \cos\left(\frac{x}{2}\right) & 3\pi \leq x \leq 5\pi \\ 0 & \text{elsewhere} \end{cases}$$

The value of a such that $\Pr(X < a) = \frac{\sqrt{3} + 2}{4}$ is

- A. $\frac{19\pi}{6}$
- B. $\frac{14\pi}{3}$
- C. $\frac{10\pi}{3}$
- D. $\frac{29\pi}{6}$
- E. $\frac{17\pi}{3}$

Question 5

Consider the discrete probability distribution with random variable X shown in the table below.

x	-1	0	b	$2b$	4
$\Pr(X = x)$	a	b	b	$2b$	0.2

The smallest and largest possible values of $E(X)$ are respectively

- A. -0.8 and 1
- B. -0.8 and 1.6
- C. 0 and 2.4
- D. 0.2125 and 1
- E. 0 and 1

Question 6

The binomial random variable, X , has $E(X) = 2$ and $\text{Var}(X) = \frac{4}{3}$.
 $\Pr(X = 1)$ is equal to

A. $\left(\frac{1}{3}\right)^6$

B. $\left(\frac{2}{3}\right)^6$

C. $\frac{1}{3} \times \left(\frac{2}{3}\right)^2$

D. $6 \times \frac{1}{3} \times \left(\frac{2}{3}\right)^5$

E. $6 \times \frac{2}{3} \times \left(\frac{1}{3}\right)^5$

Question 7

Consider the following discrete probability distribution for the random variable X .

x	1	2	3	4	5
$\Pr(X = x)$	p	$2p$	$3p$	$4p$	$5p$

The mean of this distribution is

A. 2

B. 3

C. $\frac{7}{2}$

D. $\frac{11}{3}$

E. 4

Question 8

If X is a random variable such that $\Pr(X > 5) = a$ and $\Pr(X > 8) = b$, then $\Pr(X < 5 | X < 8)$ is

- A. $\frac{a}{b}$
- B. $\frac{a-b}{1-b}$
- C. $\frac{1-b}{1-a}$
- D. $\frac{ab}{1-b}$
- E. $\frac{a-1}{b-1}$

Question 9

A soccer player is practising her goal kicking. She has a probability of $\frac{3}{5}$ of scoring a goal with each attempt. She has 15 attempts.

The probability that the number of goals she scores is less than 7 is closest to

- A. 0.0612
- B. 0.0950
- C. 0.1181
- D. 0.2131
- E. 0.7869

Question 10

John and Rebecca are playing darts. The result of each of their throws is independent of the result of any other throw. The probability that John hits the bullseye with a single throw is $\frac{1}{4}$. The probability that Rebecca hits the bullseye with a single throw is $\frac{1}{2}$. John has four throws and Rebecca has two throws.

The ratio of the probability of Rebecca hitting the bullseye at least once to the probability of John hitting the bullseye at least once is

- A. 1:1
- B. 32:27
- C. 64:85
- D. 2:1
- E. 192:175