

Name _____

Date _____

AP Statistics

Period _____

R.V. Day 2 HW

- 1) An urn contains exactly three balls numbered 1, 2, and 3, respectively. Random samples of two balls are drawn from the urn with replacement. The average, $\bar{X} = \frac{X_1 + X_2}{2}$, where X_1 and X_2 are the numbers on the selected balls, is recorded after each drawing. Which of the following describes the sampling distribution of \bar{X} ?

(A)

| | | | | | |
|-------------|---------------|---------------|---------------|---------------|---------------|
| \bar{X} | 1 | 1.5 | 2 | 2.5 | 3 |
| Probability | $\frac{1}{5}$ | $\frac{1}{5}$ | $\frac{1}{5}$ | $\frac{1}{5}$ | $\frac{1}{5}$ |

(B)

| | | | | | |
|-------------|---------------|---------------|---------------|---------------|---------------|
| \bar{X} | 1 | 1.5 | 2 | 2.5 | 3 |
| Probability | $\frac{1}{9}$ | $\frac{2}{9}$ | $\frac{1}{3}$ | $\frac{2}{9}$ | $\frac{1}{9}$ |

(C)

| | | | | | |
|-------------|---|-----|---|-----|---|
| \bar{X} | 1 | 1.5 | 2 | 2.5 | 3 |
| Probability | 0 | 0 | 1 | 0 | 0 |

(D)

| | | | | | |
|-------------|----------------|----------------|---------------|----------------|----------------|
| \bar{X} | 1 | 1.5 | 2 | 2.5 | 3 |
| Probability | $\frac{1}{10}$ | $\frac{1}{10}$ | $\frac{3}{5}$ | $\frac{1}{10}$ | $\frac{1}{10}$ |

- (E) It cannot be determined from the information given.

- 2) Let X represent a random variable whose distribution is normal, with a mean of 100 and a standard deviation of 10. Which of the following is equivalent to $P(X > 115)$?

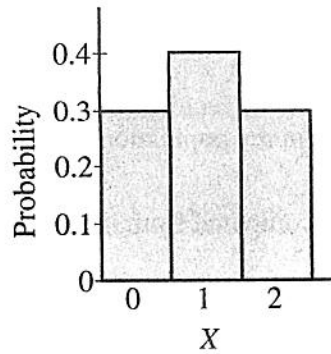
(A) $P(X < 115)$

(B) $P(X \leq 115)$

(C) $P(X < 85)$

(D) $P(85 < X < 115)$

(E) $1 - P(X < 85)$



3) A game of chance is played in which X , the number of points scored in each game, has the distribution shown above. Which of the following is true for the sampling distribution of the sum, Y , of the scores when the game is played twice?

- (A) Y takes on values 0, 1, 2 with respective probabilities 0.3, 0.4, and 0.3.
- (B) Y takes on values 0, 2, 4 according to a binomial distribution with mean equal to 2.
- (C) Y takes on values 0, 2, 4 with respective probabilities 0.3, 0.4, and 0.3.
- (D) Y takes on values 0, 1, 2, 3, 4 according to a binomial distribution with mean equal to 2.
- (E) Y takes on values 0, 1, 2, 3, 4 with respective probabilities 0.09, 0.24, 0.34, 0.24, and 0.09.

4) You have a choice of three investments, the first of which gives you a 10% chance of making \$1 million, otherwise you lose \$25,000; the second of which gives you a 50% chance of making \$500,000, otherwise you lose \$345,000; and the third of which gives you an 80% chance of making \$50,000, otherwise you make only \$1,000. Assuming you will go bankrupt if you don't show a profit, which option should you choose for the best chance of avoiding bankruptcy?

- (A) First choice
- (B) Second choice
- (C) Third choice
- (D) Either the first or the second choice
- (E) All the choices give an equal chance of avoiding bankruptcy.

5) An insurance company charges \$800 annually for car insurance. The policy specifies that the company will pay \$1000 for a minor accident and \$5000 for a major accident. If the probability of a motorist having a minor accident during the year is .2, and of having a major accident, .05, how much can the insurance company expect to make on a policy?

- (A) \$200
- (B) \$250
- (C) \$300
- (D) \$350
- (E) \$450

- 6) You can choose one of three boxes. Box A has four \$5 bills and a single \$100 bill, box B has 400 \$5 bills and 100 \$100 bills, and box C has 24 \$1 bills. You can have all of box C or blindly pick one bill out of either box A or box B. Which offers the greatest expected winning?

(A) Box A
(B) Box B
(C) Box C
(D) Either A or B, but not C
(E) All offer the same expected winning.

- 7) The average annual incomes of high school and college graduates in a mid-western town are \$21,000 and \$35,000, respectively. If a company hires only personnel with at least a high school diploma and 20% of its employees have been through college, what is the mean income of the company employees?

(A) \$23,800
(B) \$27,110
(C) \$28,000
(D) \$32,200
(E) \$56,000

- 8) At a warehouse sale 100 customers are invited to choose one of 100 identical boxes. Five boxes contain \$700 color television sets, 25 boxes contain \$540 camcorders, and the remaining boxes contain \$260 cameras. What should a customer be willing to pay to participate in the sale?

(A) \$260
(B) \$352
(C) \$500
(D) \$540
(E) \$699

- 9) The number of sweatshirts a vendor sells daily has the following probability distribution.

| Number of Sweatshirts x | 0 | 1 | 2 | 3 | 4 | 5 |
|---------------------------|-----|-----|-----|-----|------|------|
| $P(x)$ | 0.3 | 0.2 | 0.3 | 0.1 | 0.08 | 0.02 |

If each sweatshirt sells for \$25, what is the expected daily total dollar amount taken in by the vendor from the sale of sweatshirts?

(A) \$5.00
(B) \$7.60
(C) \$35.50
(D) \$38.00
(E) \$75.00

10) An employment placement agency specializes in placing workers in jobs suited for them. From past experience, the agency knows that 20% of all the workers it places will no longer be at the position in which they were placed after one year; however, only 5% of those remaining after the first year leave during the next year. At the start of a year an employer hires 100 workers using this agency, then at the start of the next year the employer hires 100 more. How many of these 200 workers are expected to be on the job at the end of the second year?

- (A) 140
- (B) 144
- (C) 152
- (D) 156
- (E) 171

11) A television game show has three payoffs with the following probabilities:

| | | | |
|--------------|----|------|--------|
| Payoff (\$): | 0 | 1000 | 10,000 |
| Probability: | .6 | .3 | .1 |

What are the mean and standard deviation for the payoff variable?

- (A) $\mu_x = 1300$, $\sigma_x = 2934$
- (B) $\mu_x = 1300$, $\sigma_x = 8802$
- (C) $\mu_x = 3667$, $\sigma_x = 4497$
- (D) $\mu_x = 3667$, $\sigma_x = 5508$
- (E) None of the above gives a set of correct answers.

12) Random variable X is normally distributed with mean 10 and standard deviation 3, and random variable Y normally distributed with mean 9 and standard deviation 4. If X and Y are independent, which of the following describes the distribution of $Y - X$?

- (A) Normal with mean 1 and standard deviation -1
- (B) Normal with mean -1 and standard deviation 1
- (C) Normal with mean -1 and standard deviation 5
- (D) Normal with mean 1 and standard deviation 7
- (E) Normal with mean -1 and standard deviation 7

| X | |
|-----|------------|
| x | $P(X = x)$ |
| 0 | 0.4 |
| 1 | 0.3 |
| 2 | 0.2 |
| 3 | 0.1 |

| Y | |
|-----|------------|
| y | $P(Y = y)$ |
| 1 | 0.1 |
| 2 | 0.2 |
| 3 | 0.3 |
| 4 | 0.4 |

13) X and Y are independent random variables; the probability distributions for each are given in the table above. Let $Z = X + Y$. What is $P(Z \leq 2)$?

- (A) 0.07
- (B) 0.15
- (C) 0.24
- (D) 0.40
- (E) 0.80