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- 1) Given  $Z \sim N(0, 1)$ ,  $P(Z > -1.53) =$
- a. 0.947
  - b. 0.942
  - c. 0.937
  - d. 0.932
  - e. 0.928
- 2) There is a 0.1 probability that neither A or B occur, and a 0.2 probability that both A and B occur. If  $P(A) = 0.4$ , what is  $P(B)$ ?
- a. 0.7
  - b. 0.72
  - c. 0.78
  - d. 0.8
  - e. 0.85
- 3) A die is thrown twice. What is the probability that both times show an even number?
- a.  $\frac{1}{7}$
  - b.  $\frac{1}{6}$
  - c.  $\frac{1}{3}$
  - d.  $\frac{1}{4}$
  - e.  $\frac{1}{2}$
- 4) Find  $P(1 \leq X < 21)$ , given that  $X \sim N(11, 25)$ .
- a. 0.909
  - b. 0.911
  - c. 0.933
  - d. 0.944
  - e. 0.955
- 5) X and Y are independent events such that  $P(X) = 0.8$  and  $P(Y) = 0.6$ . Find the probability that X or Y occurs but not both.
- a. 0.43
  - b. 0.44
  - c. 0.46
  - d. 0.48
  - e. 0.51

- 6) A random variable follows a binomial distribution such that  $X \sim B(365, 0.18)$ . What is its standard deviation?
- a. 6.78
  - b. 7.34
  - c. 7.81
  - d. 8.23
  - e. 8.56
- 7) Given  $Z \sim N(0, 1)$ ,  $P(Z > 2.576) =$
- a. 0.018
  - b. 0.010
  - c. 0.005
  - d. 0.004
  - e. 0.002
- 8) 3 chocolates are chosen randomly from a box of 10 milk chocolates and 15 dark chocolates. What is the probability of selecting exactly 2 milk chocolates?
- a.  $\frac{15}{91}$
  - b.  $\frac{25}{92}$
  - c.  $\frac{26}{89}$
  - d.  $\frac{13}{91}$
  - e.  $\frac{27}{92}$
- 9) A new lightbulb has a  $\frac{1}{15}$  chance of being defective. If 120 lightbulbs are tested, how many are expected to be defective?
- a. 8
  - b. 9
  - c. 10
  - d. 11
  - e. 12
- 10) Using a suitable approximation with the distribution  $X \sim N(48, 49)$ , find  $P(34 < X < 62)$ .
- a. 0.91
  - b. 0.92
  - c. 0.93
  - d. 0.95
  - e. 0.97

- 11) A box contains 5 burgers, 2 of which have lettuce. If 2 burgers are selected in succession, without replacement, what is the probability that the first has lettuce and the second does not?
- a. 0.25
  - b. 0.3
  - c. 0.32
  - d. 0.4
  - e. 0.47
- 12) 1 in 45 pinatas produced by a certain factory are understuffed. If a batch of 630 pinatas is inspected at random, what is the probability that the number of underweight pinatas is more than 12 and less than 17?
- a. 0.171
  - b. 0.356
  - c. 0.402
  - d. 0.242
  - e. 0.299
- 13) Find  $a$ , given that  $X \sim N(20, 11)$  and that  $P(a < X < 22) = 0.5$ .
- a. 17.5
  - b. 17.7
  - c. 18.1
  - d. 18.3
  - e. 18.4
- 14) Two light bulbs are selected at random from a large batch of bulbs in which 5% are defective. Find the probability that both bulbs are defective.
- a. 0.0025
  - b. 0.0175
  - c. 0.001
  - d. 0.25
  - e. 0.05
- 15) Approximately 0.5% of Americans and 0.4% of Britons have dual citizenship. In a random sample of 200 Americans and 300 Britons (there is no overlap), what is the probability that exactly one person has dual citizenship?
- a. 0.344
  - b. 0.312
  - c. 0.272
  - d. 0.244
  - e. 0.213

- 16) Find  $P(X < 69.1)$ , given that  $X \sim N(72, 11)$ .
- a. 0.255
  - b. 0.233
  - c. 0.211
  - d. 0.201
  - e. 0.191
- 17) A purebred Labrador puppy has a  $\frac{3}{7}$  probability of being black in color. Of 56 purebred Labrador puppies, how many would you expect to NOT be black?
- a. 35
  - b. 34
  - c. 33
  - d. 32
  - e. 31
- 18) 0.3% of a factory's clickers have a malfunctioning door. What is the probability that a random sample of 200 clickers will have exactly 1 bad door?
- a. 0.323
  - b. 0.330
  - c. 0.342
  - d. 0.353
  - e. 0.373
- 19) In the standard normal distribution,  $P(1.5 < Z < 2.5) =$
- a. 0.0606
  - b. 0.0616
  - c. 0.0656
  - d. 0.0716
  - e. 0.0726
- 20) A bag contains 3 times as many yellow marbles as blue marbles. A marble is chosen at random. Find the probability that it is yellow.
- a. 0.69
  - b. 0.72
  - c. 0.75
  - d. 0.77
  - e. 0.81
- 21) A fair die is rolled 10 times consecutively. Find the probability that it shows a 6 exactly thrice.
- a. 0.098
  - b. 0.102
  - c. 0.123
  - d. 0.155
  - e. 0.172

- 22) In the standard normal distribution  $Z \sim N(0, 1)$ ,  $P(Z < k) = 0.9087$ . What is  $k$ ?

- a. 1.22
- b. 1.25
- c. 1.29
- d. 1.33
- e. 1.34

Consider the probability distribution at right. What is:

- 23) ... the expected value?

- a. 1.9
- b. 2.1
- c. 2.2
- d. 2.3
- e. 2.6

- 24) ... the variance?

$x$	0	1	2	3
$P(X = x)$	0.1	0.12	0.36	0.42

- a. 0.89
- b. 0.91
- c. 0.93
- d. 0.94
- e. 0.95

A group of 15 people includes exactly 1 pair of sisters and exactly 1 set of 3 brothers. The 15 people are arranged randomly in a line. Find the probability that:

- 25) ... the sisters are next to each other.

- a. 0.11
- b. 0.13
- c. 0.14
- d. 0.16
- e. 0.17

- 26) ... the sisters are next to each other and the brothers are all next to each other.

- a. 0.0025
- b. 0.0029
- c. 0.0031
- d. 0.0038
- e. 0.0044

The letters of KETTLE are arranged randomly in a row. Find the probability that:

- 27) ... the two Es are together.

- a.  $\frac{1}{2}$
- b.  $\frac{1}{3}$
- c.  $\frac{1}{4}$
- d.  $\frac{2}{3}$
- e.  $\frac{3}{4}$

- 29) ... the Es and Ts are together in 1 group.

- a.  $\frac{1}{5}$
- b.  $\frac{1}{4}$
- c.  $\frac{1}{3}$
- d.  $\frac{1}{6}$
- e.  $\frac{1}{7}$

- 28) ... the two Es are together and the two Ts are together.

- a.  $\frac{8}{15}$
- b.  $\frac{7}{16}$
- c.  $\frac{3}{5}$
- d.  $\frac{2}{15}$
- e.  $\frac{1}{5}$

Consider the probability distribution at right and find:

$x$	0	1	2	3
$P(X = x)$	0.05	$m$	0.5	0.3

30) ... the value of  $m$ .

- a. 0.15
- b. 0.18
- c. 0.21
- d. 0.24
- e. 0.27

$X \sim B(n, p)$  with  $E(X) = 20$  and  $\text{Var}(X) = 12$ . Find:

32) ...  $p$ .

- a. 0.3
- b. 0.4
- c. 0.43
- d. 0.46
- e. 0.5

34) Shiba puppies are equally likely to be brown or black. What is the probability that of a litter of 5, exactly 1 is black?

- a. 0.141
- b. 0.148
- c. 0.156
- d. 0.162
- e. 0.171

35) 90% of brown shibas have white paws. What is the probability that 4 randomly chosen brown shibas all have white paws?

- a. 0.486
- b. 0.526
- c. 0.586
- d. 0.616
- e. 0.656

31) ... the expected value.

- a. 2.14
- b. 2.11
- c. 2.09
- d. 2.05
- e. 2.01

33) ...  $n$ .

- a. 42
- b. 45
- c. 50
- d. 51
- e. 54