

PRINTABLE VERSION

Quiz 3

You scored 100 out of 100

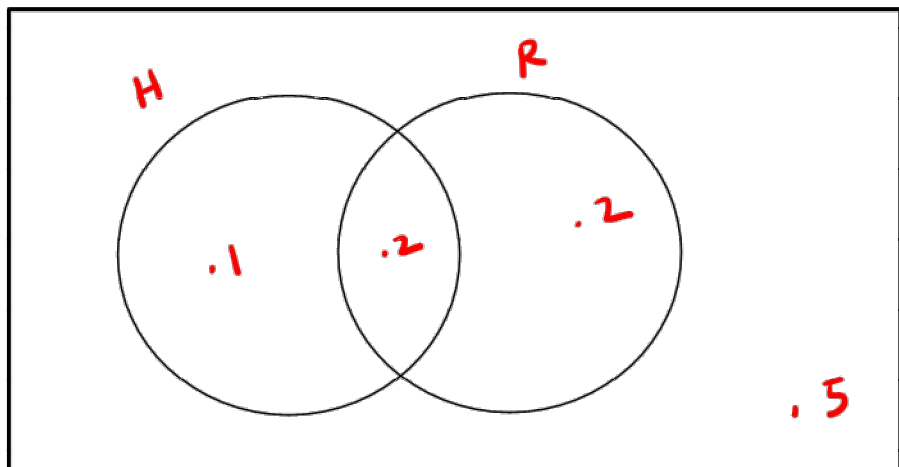
Question 1

$$P(H|R) = \frac{P(H \cap R)}{P(R)} = \frac{.2}{.4} = 0.5$$

Your answer is CORRECT.

The probability that a randomly selected person has high blood pressure (the event H) is $P(H) = 0.3$ and the probability that a randomly selected person is a runner (the event R) is $P(R) = 0.4$. The probability that a randomly selected person has high blood pressure and is a runner is 0.2. Find the probability that a randomly selected person has high blood pressure, given that he is a runner.

- a) ☐ 0.29
- b) ☐ 0
- c) ☒ 0.50
- d) ☐ 0.67
- e) ☐ 1
- f) ☐ None of the above.



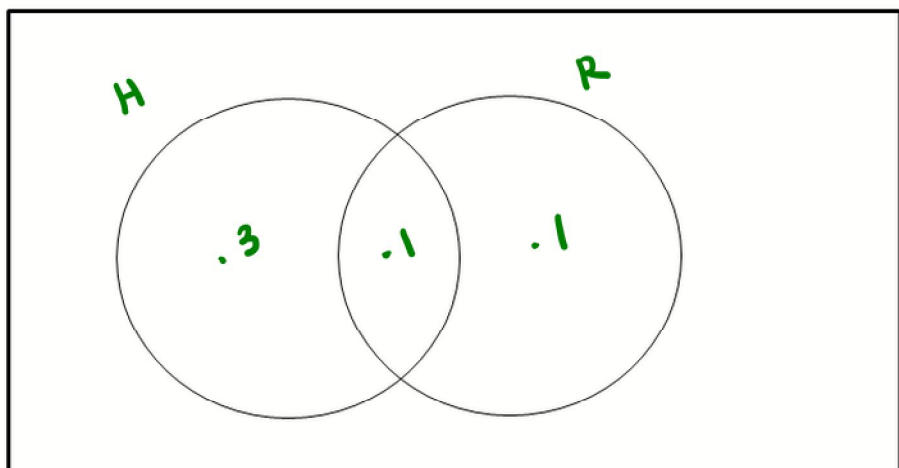
Question 2

$$P(R|H) = \frac{P(R \cap H)}{P(H)} = \frac{.1}{.4} = 0.25$$

Your answer is CORRECT.

The probability that a randomly selected person has high blood pressure (the event H) is $P(H) = 0.4$ and the probability that a randomly selected person is a runner (the event R) is $P(R) = 0.2$. The probability that a randomly selected person has high blood pressure and is a runner is 0.1. Find the probability that a randomly selected person is a runner, given that he has high blood pressure.

- a) ☒ 0.25
- b) ☐ 1
- c) ☐ 0.50
- d) ☐ 0.17
- e) ☐ 0



f) ☐ None of the above.

Question 3

Your answer is CORRECT.

The probability that a student correctly answers on the first try (the event A) is $P(A) = 0.1$. If the student answers incorrectly on the first try, the student is allowed a second try to correctly answer the question (the event B). The probability that the student answers correctly on the second try given that he answered incorrectly on the first try is 0.2. Find the probability that the student correctly answers the question on the first or second try.

a) ☐ 0.30

b) ☐ 0.02

c) ☐ 0.26

d) ☐ 0.19

☒ e) 0.28

f) ☐ None of the above.

$P(A) = 0.1$ (answer on 1st try) $P(B|A^c) = 0.2$
 $P(B) = ?$ (answer on 2nd try)
 $P(A^c) = 0.9$
 $P(B|A^c) = \frac{P(B \cap A^c)}{P(A^c)}$
 $0.2 = \frac{P(B \cap A^c)}{0.9}$
 $P(B \cap A^c) = 0.18$
 $P(A \cup B) = ?$
 \uparrow Quiz Question
 $A: .1 + B: .18 = .28 = P(A \cup B)$

Question 4

Your answer is CORRECT.

Given the following sampling distribution:

X	-19	-14	-3	12	15
P(X)	$\frac{1}{25}$	$\frac{1}{50}$	$\frac{2}{25}$	$\frac{1}{50}$	

What is $P(X = 15)$?

a) ☐ 0.82

b) ☐ 0.86

c) ☐ 0.83

d) ☐ 0.15

☒ e) 0.84

f) ☐ None of the above

$$\frac{1}{25} + \frac{1}{50} + \frac{2}{25} + \frac{1}{50} + x = 1$$

$$x = 0.84$$

Question 5

Your answer is CORRECT.

Given the following sampling distribution:

X	-18	-10	-3	5	17
P(X)	$\frac{1}{20}$	$\frac{2}{25}$	$\frac{1}{100}$	$\frac{1}{50}$	

$$\frac{1}{20} + \frac{2}{25} + \frac{1}{100} + \frac{1}{50} + x = 1$$

$$x = \frac{21}{25}$$

What is $P(X > -10)$?

$$P(X > -10) = \frac{1}{100} + \frac{1}{50} + \frac{21}{25}$$

$$= \frac{87}{100} = 0.87$$

a) ☐ 0.90b) ☐ 0.88c) ☐ 0.85d) ☐ 0.86e) ☒ 0.87f) ☐ None of the above

Question 6

Your answer is CORRECT.

Given the following sampling distribution:

X	-20	-10	2	12	20
P(X)	$\frac{9}{100}$	$\frac{1}{25}$	$\frac{9}{100}$	$\frac{7}{100}$	

$$\frac{9}{100} + \frac{1}{25} + \frac{9}{100} + \frac{7}{100} + x = 1$$

$$x = \frac{71}{100}$$

What is the mean of this sampling distribution?

a) ☐ 0.2b) ☐ 12.9c) ☐ 13.2d) ☒ 13.0e) ☐ 0.8f) ☐ None of the above

$$E[X] = -20\left(\frac{9}{100}\right) - 10\left(\frac{1}{25}\right) + 2\left(\frac{9}{100}\right) + 12\left(\frac{7}{100}\right) + 20\left(\frac{71}{100}\right)$$

$$E[X] = 13.02$$

Question 7

Your answer is CORRECT.

Suppose you have a distribution, X , with mean = 6 and standard deviation = 8. Define a new random variable $Y = 9X - 3$. Find the mean and standard deviation of Y .

- a) ☐ $E[Y] = 51; \sigma Y = 69$
- b) ☒ $E[Y] = 51; \sigma Y = 72$**
- c) ☐ $E[Y] = 51; \sigma Y = 648$
- d) ☐ $E[Y] = 54; \sigma Y = 648$
- e) ☐ $E[Y] = 54; \sigma Y = 69$
- f) ☐ None of the above

$$E[Y] = E[9X - 3] = 9E[X] - 3 = 9(6) - 3 = 51$$

$$\text{VAR}[Y] = 9^2 \text{VAR}[X] = 81 \cdot 64 = 5184$$

$$S_Y = \sqrt{5184} = 72$$

Question 8

Your answer is CORRECT.

In testing a certain kind of missile, target accuracy is measured by the average distance X (from the target) at which the missile explodes. The distance X is measured in miles and the sampling distribution of X is given by:

X	0	10	50	100
$P(X)$	$\frac{1}{18}$	$\frac{1}{9}$	$\frac{2}{9}$	$\frac{11}{18}$

Calculate the mean of this sampling distribution.

- a) ☐ 74.8
- b) ☒ 73.3**
- c) ☐ 70.8
- d) ☐ 1300.0
- e) ☐ 36.1
- f) ☐ None of the above

$$E[X] = 0\left(\frac{1}{18}\right) + 10\left(\frac{1}{9}\right) + 50\left(\frac{2}{9}\right) + 100\left(\frac{11}{18}\right) = 73.3$$

Question 9

Your answer is CORRECT.

In testing a certain kind of missile, target accuracy is measured by the average distance X (from the target) at which the missile explodes. The distance X is measured in miles and the sampling distribution of X is given by:

	X^2	0	100	2500	10000
X		0	10	50	100
P(X)		$\frac{1}{22}$	$\frac{1}{11}$	$\frac{2}{11}$	$\frac{15}{22}$

Calculate the variance of this sampling distribution.

a) ☐ 34.2

b) ☒ 1169.4

c) ☐ 4010.5

d) ☐ 389.8

e) ☐ 78.2

f) ☐ None of the above

$$E[X] = 0\left(\frac{1}{22}\right) + 10\left(\frac{1}{11}\right) + 50\left(\frac{2}{11}\right) + 100\left(\frac{15}{22}\right) = \frac{860}{11}$$

$$E[X^2] = 0\left(\frac{1}{22}\right) + 100\left(\frac{1}{11}\right) + 2500\left(\frac{2}{11}\right) + 10000\left(\frac{15}{22}\right) = 7281.8$$

$$\text{VAR}[X] = 7281.8 - \left(\frac{860}{11}\right)^2 = 1169.4$$

Question 10

Your answer is CORRECT.

Suppose you want to play a carnival game that costs 7 dollars each time you play. If you win, you get \$100. The probability of winning is $\frac{1}{100}$. What is the expected value of the amount the carnival stands to gain?

a) ☐ -6.00

b) ☐ 5.90

c) ☐ 6.10

d) ☐ 1.00

☒ e) 6.00

f) ☐ None of the above

	W	L
X	93	-7
P(X)	$\frac{1}{100}$	$\frac{99}{100}$

$$E[X] = 93\left(\frac{1}{100}\right) - 7\left(\frac{99}{100}\right) = 6$$

Question 11

Your answer is CORRECT.

Suppose you want to play a carnival game that costs 8 dollars each time you play. If you win, you get

\$100. The probability of winning is $\frac{3}{100}$. What is the expected value of the amount that you, the player, stand to gain?

X	W	L
	92	-8
P(X)	$\frac{3}{100}$	$\frac{97}{100}$

a) ☐ 5.00

b) ☐ -5.10

☒ c) -5.00

d) ☐ -3.00

e) ☐ -5.30

f) ☐ None of the above

$$92\left(\frac{3}{100}\right) - 8\left(\frac{97}{100}\right) = \$ -5$$

Question 12

Your answer is CORRECT.

A random sample of 2 measurements is taken from the following population of values: 0, 1, 3, 4, 7. What is the probability that the range of the sample is 3?

a) ☐ 0.4

b) ☐ 0.5

c) ☐ 0.6

☒ d) 0.3

e) ☐ 0.1

f) ☐ None of the above

$$\frac{3}{5C_2} = \frac{3}{10} = 0.3$$

3
|
|
|
3
3
↑
3 have range of 3

Question 13

Your answer is CORRECT.

A furniture store is having a sale on sofas and you're going to buy one. The advertisers know that buyers get to the store and that 1 out of 4 buyers change to a more expensive sofa than the one in the sale advertisement. Let X be the cost of the sofa. What is the average cost of a sofa if the advertised sofa is \$300 and the more expensive sofa is \$450?

a) ☐ 330.00

☒ b) 337.50

c) ☐ 337.72

X	450	300
P(X)	$\frac{1}{4}$	$\frac{3}{4}$

d) ☐ 375.00

e) ☐ 412.50

f) ☐ None of the above

$$E[X] = (450) \left(\frac{1}{4}\right) + (300) \frac{3}{4}$$

$$E[X] = 337.50$$