

AP Statistics - Random Variables, Expected Value and Combining Variables - Test

Common Core AP STAT 4.7, AP STAT 4.8, AP STAT 4.9, HSS-MD.A.1, HSS-MD.A.2, HSS-MD.B.5 · maths-pdf.fr/en/

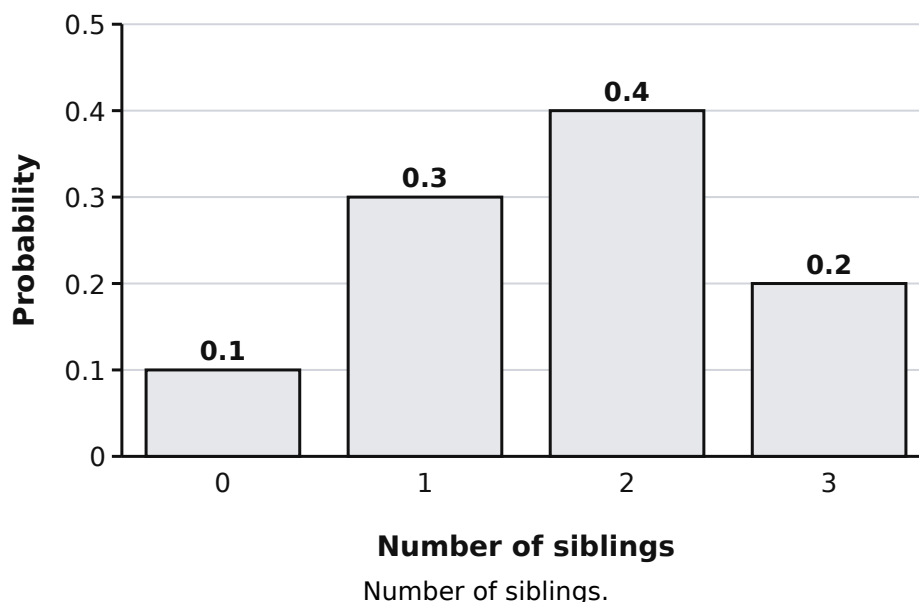
Name: _____ Class: _____ Date: ____/____/____

This 45-minute test covers discrete distributions, expected value, standard deviation, linear transformations, and combining independent random variables. Show every table and formula.

About this test

- Grade: AP Statistics
- Chapter: Random Variables, Expected Value and Combining Variables
- Standards: AP STAT 4.7, AP STAT 4.8, AP STAT 4.9, HSS-MD.A.1, HSS-MD.A.2, HSS-MD.B.5
- Time: 45 minutes
- Total: 20 points

Question 1 - Mean and SD [4 pts]



Let X be the number of siblings. (a) Find the mean. (1 point) (b) Find the standard deviation. (2 points) (c) Interpret the mean. (1 point)

Question 2 - Linear transformation [2 pts]

Profit is $Y = 5X - 20$ where X has mean 12 and standard deviation 3. Find the mean and standard deviation of Y .

Question 3 - Independent sum [3 pts]

Two independent machines make parts with mean lengths 20 cm and 30 cm and standard deviations 0.3 and 0.4. Find the mean and standard deviation of the total length, and of the difference (longer minus shorter). (3 points)

Question 4 - Fair game [3 pts]

Outcome	Net gain	Probability
Win	+\$9	0.1
Lose	-\$1	0.9

A carnival game.

(a) Find the expected net gain. (2 points) (b) Is the game fair? (1 point)

Question 5 - Variances add [2 pts]

X and Y are independent, with standard deviations 6 and 8. Find the standard deviation of $X + Y$ and explain why it is not 14.

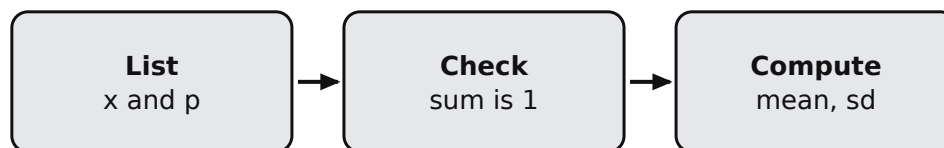
Question 6 - $2X$ versus $X + Y$ [2 pts]

X has mean 5 and standard deviation 2. Y is an independent copy. Find the mean and sd of $2X$ and of $X + Y$.

Question 7 - Insurance [2 pts]

A warranty costs \$60. It pays \$400 with probability 0.1 and nothing otherwise. Find the expected profit to the seller per warranty.

Question 8 - Valid distribution [2 pts]



Steps.

X takes values 1, 2, 3, 4 with probabilities 0.15, 0.35, k, 0.25. Find k and $P(X \geq 3)$.