Expected value

1)

Hugo plans to buy packs of baseball cards until he gets the card of his favorite player, but he only has enough money to buy at most 4 packs. Suppose that each pack has probability 0.2 of containing the card Hugo is hoping for.

Let the random variable X be the number of packs of cards Hugo buys. Here is the probability distribution for X:

X=# of packs	1	2	3	4	
P(X)	0.2	0.16	0.128	?	

Find the indicated probability.



2)

A certain lottery ticket costs \$2, and the back of the ticket says, "The overall odds of winning a prize with this ticket are 1:50, and the expected return for this ticket is 0.95."

Which interpretations of the expected value are correct?

Choose all answers that apply:

(A) The probability that one of these tickets wins a prize is 0.95, on average.

(B) Someone who buys this ticket is most likely to win 0.95.

 \bigcirc If we looked at many of these tickets, the average return would be about 0.95 per ticket.

 \bigcirc If 1,000 people each bought one of these tickets, they'd expect a net gain of about \$950 in total.

3)

A construction company is considering submitting bids for two contracts. It will cost the company \$10,000 to prepare and submit the bids, and if won, each bid would produce \$50,000 of income to the company. The company estimates that it has a 10% chance of winning any given bid.

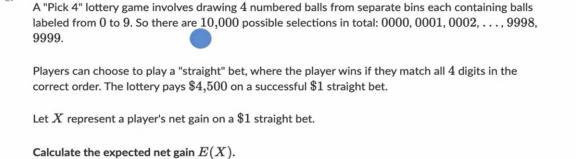
Here is the probability distribution of X = the number of bids the company wins, and M = the amount of money the company profits from the bids.

X = the number of bids won	0	1	2
M = profit			
Probability			

Calculate the mean of *M*.

4)

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Hint: The expected net gain can be negative.

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5)		

An electronics store gives customers the option of purchasing a protection plan when customers buy a new television. The customer pays \$80 for the plan, and if their television is damaged or stops working, the store will replace it for no additional charge. The store knows that 2% of customers who buy this plan end up needing a replacement that costs the store \$1,200 each.

Here is a table that summarizes the possible outcomes from the store's perspective:

Replacement?	Cost	Net gain (X)
Yes	\$1,200	$-\$1,\!120$
No	\$0	\$80

Let X represent the store's net gain from one of these plans.

Calculate the expected net gain E(X).

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