Expected Value
Contemporary Math (MAT-130)

Solve each expected value problem.

1. Four coins are tossed. Find the expected number of heads.

2. An insurance company insures a house worth $250000 for an annual premium of $500. If the probability of the house being destroyed is .0015 and assuming either total loss or no loss, what is the insurance company's expected annual profit for the policy?

3. The following table shows the payouts for a game played with a single die. Each roll costs $2. If you are playing this game what is your expected profit or loss for each roll?

Dice roll	1	2	3	4	5	6
Payment	$0	$0	$0	$2	$3	$4

4. Rick wants to sell his car to Bill who owns a used car dealership. Bill determines that the probabilities of him reselling the car for $2000, $2500, or $3000 are .26, .64, and .10 respectively. How much should Bill pay Rick if he wants his expected profit to be $500?

5. Sandra is considering bids for a public building project. The following table summarizes the amount of time it will take for two competing companies to complete the project. Find the expected amount of time it will take for each company to finish the project.

	Time (Months)	4	6	8	10
Company A	Probability	0.55	0.20	0.15	0.10
Company B	Time (Months)	2	5	8	9
	Probability	0.05	0.75	0.15	0.05

6. Wendy and Sally are playing a game of chance. Wendy gives Sally a set amount of money and then rolls a single fair die. Sally pays her as much as her roll (i.e. If Wendy rolls a 4 Sally pays Wendy $4). How much should Wendy give Sally to make the game fair?

7. A lottery jackpot is 10 million dollars. If the probability of winning the jackpot is 0.00000005. If a lottery ticket is $1, what is your expected profit or loss if you buy a single ticket?

8. The jackpot of the lottery from problem 7 has increased to 25 million dollars. What is your new expected profit or loss if you buy a single ticket?

9. For a certain tutor the probabilities for various number of student no-shows per day are shown in the following table. How many no-shows can that tutor expect per day?

Number of no-shows	0	1	2	3	4	5
Probability	0.40	0.25	0.15	0.10	0.07	0.03

Solutions:

1. 2
2. $125
3. $0.50 loss
4. $1920
5. Company A = 5.6 months; Company B = 5.5 months
6. $3.50
7. $0.50 loss
8. $0.25 profit
9. 1.28 no-shows