Problem 1. *Compute the expected value for the following situations:*

(a) You draw a card at random from a standard deck. If it's a facecard, you get $10, if it's not, you lose $5.

(b) You roll a die and get as many dollars as it shows.

(c) Your car has a flat tire. The tire might need to be replaced for $200, or just repaired for $50. You're, like, 90% sure it just needs to be repaired.

Problem 2. *Suppose you own a gas station. A customer comes in with a gun and asks for all your money. You have $5000 of cash in the store. If you get shot, you'll have to pay $100,000 in hospital bills. But the gun looks fake (90% sure) and you know kung fu. What should you do?*

Customers are unpredictable. Even if you hand the money over, there's a 25% chance you'll get shot anyway (if the gun is real in the first place). How does that change things?

Problem 3. *Consider the following two games:*

A: *You flip a coin. If it is heads, you get $2. If it's tails, you get $4.*

B: *You flip two coins. If they are the same, you get $7. If not, you lose $2.*

C: *You flip two coins. If they are both heads, you lose $12. Otherwise, you get $8.*

(a) What is the expected value for each game?

(b) If you play each game 10 times, how much money do you expect to gain?

(c) Which game is most likely to be close to the expected amount? (Hint: variance.)

Problem 4. *The maximum daily temperatures in January this year were as follows:*

Day	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	...
°F	35	20	20	36	33	-1	11	21	32	41	41	44	51	38	26	...

...	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
...	37	32	29	38	41	28	21	6	26	34	44	16	14	30	37	31

(a) What were the mean, median, max, and min of these?

(b) Draw a line graph to show the temperatures.

(c) How many days were below freezing? Use a pie chart to show this data.

(d) What was the distribution of the temperatures like? Answer using a box plot with 5-degree boxes.

Problem 5. *Suppose you pick eight English letters at random. What is more likely, "htvwfrfo" or "unlikely"? What is the probability of each?*

Problem 6. *Suppose you are rolling a die for fun. If your last three rolls were 3s, what is the probability that the next roll will also be a 3?*