Unit 7, Module 16: Discrete Random Variables — Handout #6

The table below shows the distribution for the number of pets in a household in San Francisco.

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| --- | --- | --- | --- | --- | --- |
| X | 0 | 1 | 2 | 3 | 4 |
| P(X) | 0.341 | 0.309 | 0.267 | 0.062 | 0.021 |

**Use this sheet or write answers on a separate sheet. Show steps in your calculations, if you did them. For example, P(0 or 1) = 0.341 + 0.309 = 0.650.**

1. If we were to randomly select a household in San Francisco, what is the probability that the house has one pet?
2. What is the chance that a household in San Francisco has three pets?
3. What is the likelihood that a household in San Francisco has more than three pets?
4. What is the probability that a household in San Francisco has one or two pets?
5. What is the chance that a household in San Francisco has less than three pets?
6. What is the probability that a San Francisco household has at least two pets?

7. What is likelihood that a San Francisco household has three pets or less?

8. What is the chance that a San Francisco household has three pets or more?

9. What is the probability that a San Francisco household has at least one pet?

10. What is the probability that a San Francisco household has at most three pets?

11. If we randomly selected 2000 San Francisco households, about how many would you expect to have exactly 2 pets?

12. What is the expected number of pets per San Francisco household?

13. What is the standard deviation of the probability distribution? 

1. We have to pay $5 to play a game where we roll a fair, six sided die. If we roll a 1 or a 2, we win $5. If we roll a 3 or a 4, we lose $5. If we roll a 5, we win $10 and if we roll a 6, we win $20. Using the following chart, write a probability model for this experiment. What would make sense as the random variable X in this problem? Assume that we have to pay the $5 regardless of what we win. After you fill in the chart, find the expected amount of money we would win, if we played this game many times.

|  |  |
| --- | --- |
| Random Variable X | Probability P(x) |
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|  |  |
|   |   |
|   |   |

1. A building contractor pays $250 to bid on a contract. If he gets the contract, the probability of which is 0.2, he will make $10,000 on the job (net). On the other hand, if he does not get the contract, he loses the $250 he paid to bid. Find the contractor’s expected net profit on a bid. Interpret the result.
2. In a raffle the prizes include one first prize of $3,000, five second prizes of $1,000 each and twenty third prizes of $100 each. In all, 10,000 tickets are sold at $1.50 each. What are the expected net winnings of a person who buys one ticket? What does this mean?