PROBABILITY-EXPECTED VALUE QUESTIONS

1. A factory manager is considering whether to replace a temperamental machine. A review of past records indicates the following probability distribution for the number of breakdowns of this machine in a week.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Number of Breakdowns | 0 | 1 | 2 | 3 | 4 |
| Probability | 0.10 | 0.26 | 0.42 | 0.16 | 0.06 |

1. Find the mean of the number of weekly breakdowns.
2. Find the standard deviation of the number of weekly breakdowns.
3. It is estimated that each breakdown costs the company $1500 in lost output. Find the mean of the weekly cost to the company from breakdowns of this machine.
4. Smile Photographs takes school pictures and charges only 5 TL for a sitting, which consists of six poses. The company then makes up three packages that are offered to the parents, who have a choice of buying 0, 1, 2 or all of the packages. Based on his experience in the business, Mr. Özçekim has assessed the following probabilities of the number of packages that might be purchased by a parent:

|  |  |  |
| --- | --- | --- |
| Number of Packages (X) | | P(X) |
| 0 | 0.30 | |
| 1 | 0.40 | |
| 2 | 0.20 | |
| 3 | 0.10 | |

1. What is the expected number of packages to be purchased by each parent?
2. What is the standard deviation for the random variable ?
3. Suppose all of the picture packages are to be priced at the same level. How much should they be priced if Smile Photographs wants to break even? Assume that the production costs are 15 TL per package. Remember that the sitting charge is 5 TL.
4. The McMillan Newspaper Company sometimes makes printing errors in its advertising and is forced to provide corrected advertising in the next issue of the paper. The managing editor has done a study of this problem and found the following data:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Number of Errors | 0 | 1 | 2 | 3 | 4 |
| Relative frequency | 0.56 | 0.21 | 0.13 | 0.07 | 0.03 |

1. Using the relative frequencies as probabilities, what is the expected number of errors? Interpret what this value means to the managing editor.
2. Compute the standard deviation of the number of errors.
3. Write a new expected value and variance question for a discreate random variable. Write it and its answer.