**OBJECTIVE :** LET X BE A RANDOM VARIABLE WITH THE FOLLOWING PROBABILITY DISTRIBUTION :

|  |  |  |  |
| --- | --- | --- | --- |
| **X** | -2 | 4 | 8 |
| **P(X)** | 1/2 | 1/6 | 1/3 |

FIND**:**

1. E(X) ii) E(3X+4) iii) V(X) iv) V(3X+4)

**WORKING EXPRESSION:**

Let X be a random variable with probability mass function (pmf) P(X), then

And Variance,

**COMPUTATION:**

From Excel :

|  |  |  |  |
| --- | --- | --- | --- |
| **X** | **P(X)** | **X\*P(X)** | **X^2\*P(X)** |
| -2 | 0.5 | -1 | 2 |
| 4 | 0.166666667 | 0.666666667 | 2.666666667 |
| 8 | 0.333333333 | 2.666666667 | 21.33333333 |
| **Total** | **1** | **2.333333333** | **26** |

From Excel :

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Symbol | Value | Formula |
| Expectation of X | E(X) | 2.333333333 | D6 |
|  | E(3X+4) | 11 | 3\*D9+4 |
|  | E(X^2) | 26 | E6 |
| Variance of X | V(X) | 20.55555556 | D11-D9^2 |
|  | V(3X+4) | 185 | 3^2\*D12 |

**OBJECTIVE :** FIT THE BINOMIAL DISTRIBUTION FROM THE FOLLOWING DATA :

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **X** | 0 | 1 | 2 | 3 | 4 |
| **F** | 50 | 65 | 80 | 30 | 10 |

**WORKING EXPRESSION :**

Let X be a discrete random variable that follows the binomial distribution with parameter n and p, then its pmf is given by

; x = 0, 1, 2, … ..., n

The Expected Frequency or Theoretical Frequency = N\*p(x)

Where, N =

And

**COMPUTATION :**

From Excel:

|  |  |  |
| --- | --- | --- |
| **X** | **F** | **fx** |
| 0 | 50 | 0 |
| 1 | 65 | 65 |
| 2 | 80 | 160 |
| 3 | 30 | 90 |
| 4 | 10 | 40 |
| **Total** | **235** | **355** |

From Excel,

|  |  |  |  |
| --- | --- | --- | --- |
| **Parameter** | **Symbol** | **Value** | **Formula** |
| No. of trials | n | 4 | G7 |
| Prob. of success | p | 0.377659574 | (I8/H8)/I11 |
| Prob. of failure | q | 0.622340426 | 1-I12 |

Fitted binomial distribution,

|  |  |  |  |
| --- | --- | --- | --- |
| **X** | **Observed freq.** | **P(x)** | **Expected freq.** |
| 0 | 50 | 0.150007181 | 35.25168756 |
| 1 | 65 | 0.364119995 | 85.56819885 |
| 2 | 80 | 0.33144256 | 77.88900152 |
| 3 | 30 | 0.134087873 | 31.51065019 |
| 4 | 10 | 0.020342391 | 4.780461887 |
| **Total** | **235** | **1** | **235** |

**CONCLUSION : Hence found the fitted binomial distribution with expected frequency 235.**