

Math 221: Basic Statistics Quiz #6 Solutions

Week #8

A simple way to solve this problem is to complete the table provided with two extra rows. To save space, the table has been transposed. Then, the expected value μ and the variance σ^2 are computed using the formulas

$$\mu = \sum x \cdot p \text{ and } \sigma^2 = \sum x^2 \cdot p - \mu^2.$$

For each version, this gives

x	p	$x \cdot p$	$x^2 \cdot p$
0	.994	0	0
-30,000	.004	-120	36×10^5
-60,000	.001	-60	36×10^5
-90,000	.001	-90	81×10^5
Total	1.000	- 270	153×10^5

$$\mu = -\$270$$

$$\sigma^2 = 153 \times 10^5 - (-270)^2$$

$$= 15,227,100$$

$$\sigma = \$3,902.19$$

x	p	$x \cdot p$	$x^2 \cdot p$
0	.991	0	0
-30,000	.005	-150	45×10^5
-60,000	.002	-120	72×10^5
-90,000	.002	-180	162×10^5
Total	1.000	- 450	279×10^5

$$\mu = -\$450$$

$$\sigma^2 = 279 \times 10^5 - (-450)^2$$

$$= 27,697,500$$

$$\sigma = \$5,262.84$$

x	p	$x \cdot p$	$x^2 \cdot p$
0	.988	0	0
-30,000	.006	-180	54×10^5
-60,000	.003	-180	108×10^5
-90,000	.003	-270	243×10^5
Total	1.000	- 630	405×10^5

$$\mu = -\$630$$

$$\sigma^2 = 405 \times 10^5 - (-630)^2$$

$$= 40,103,100$$

$$\sigma = \$6,332.70$$