



Find the expected number of repairs this kind of freezer is expected to need each year.

# of repairs	0	1	2	3
P(X=x)	0.80	0.11	0.05	0.04

$$E(X) = 0(.8) + 1(.11) + 2(.05) + 3(.04) = .33 \text{ repairs}$$

Find the standard deviation of the number of repairs each year.

- Var(X) = $(0-.33)^2(.8) + (1-.33)^2(.11) + (2-.33)^2(.05) + (3-.33)^2(.04) = 0.561$

- Standard Deviation: $\sqrt{.561} = 0.749$

What are the mean and standard deviation of the restaurant's annual expense for the service contract?

- Let $C = \$125 + \$35X$
- $E(C) = \$125 + \$35(0.33) = \$136.55$
- St. Dev.(C) = $\$35(0.749) = \26.22

How many times should the restaurant expect to have to get this freezer repaired over the 3-year term of the lease?

- $E(X_1+X_2+X_3) = 0.33 + 0.33 + 0.33 = .99$ repairs

What is the standard deviation of the number of repairs that may be required during the 3-year term of the lease? On what assumption does your calculation rest? Do you think this assumption is reasonable?

- $\text{Var}(X_1 + X_2 + X_3) =$
- $.561 + .561 + .561 = 1.683$
- $\text{Standard Deviation}(X) = 1.297$
- The assumption is that the number of repairs is independent from year to year. This might be incorrect because some freezers might need more service than others.

The yearly service contract for the food fryer estimates a mean annual cost of \$140 with a standard deviation of \$40. What is the expected value and standard deviation of the total cost for the service contracts for the freezer and the food fryer?

- $E(\text{Freezer} + \text{Fryer}):$
- $\$136.55 + \$140 = \$276.55$
- $\text{Var}(\text{Freezer} + \text{Fryer}):$
- $(\$26.22)^2 + (\$40)^2 = 2287.49$
- $\text{Standard Deviation:}$
- $\$47.83$

Which service contract should the restaurant expect to cost more each year? How much more? With what standard deviation?

- The food fryer's service contract is expected to cost more.
- $E(\text{fryer} - \text{freezer}) = \$140 - \$136.55 = \3.45 more
- $\text{Var}(\text{fryer} - \text{freezer}) = \47.83 (same as the sum in the previous problem).