BE the gambler solution

Take a look at the poster for the slot machine on the facing page. Your job is to play like you're the gambler and work out the probability of getting each combination on the poster. What's the probability of not winning anything?

probability of $ $ $

$P(\$, \$, \$) = P(\$) \times P(\$) \times P(\$)$

$= 0.1 \times 0.1 \times 0.1$

$= 0.001$

The probability of a dollar sign appearing in a window is 0.1

probability of $ $ cherry (any order)

There are three ways of getting this:

$P(\$, \$, \text{cherry}) + P(\$, \text{cherry}, \$) + P(\text{cherry}, \$, \$)$

$= (0.1^2 \times 0.2) + (0.1^2 \times 0.2) + (0.1^2 \times 0.2)$

$= 0.006$

probability of lemon lemon lemon

$P(\text{lemon, lemon, lemon}) = P(\text{lemon}) \times P(\text{lemon}) \times P(\text{lemon})$

$= 0.2 \times 0.2 \times 0.2$

$= 0.008$

A lemon appearing in a window is independent of ones appearing in the other two windows, so you multiply the three probabilities together.

probability of cherry cherry cherry

$P(\text{cherry, cherry, cherry}) = P(\text{cherry}) \times P(\text{cherry}) \times P(\text{cherry})$

$= 0.2 \times 0.2 \times 0.2$

$= 0.008$

probability of winning nothing

This means we get none of the winning combinations.

Rather than work out all the possible ways in which you could lose, you can say P(losing) = 1 – P(winning).

$P(\text{losing}) = 1 - P(\$, \$, \$) - P(\$, \$, \text{cherry (any order)}) - P(\text{cherry, cherry, cherry}) - P(\text{lemon, lemon, lemon})$

$= 1 - 0.001 - 0.006 - 0.008 - 0.008$

$= 0.977$

These are the four probability values we calculated above.