

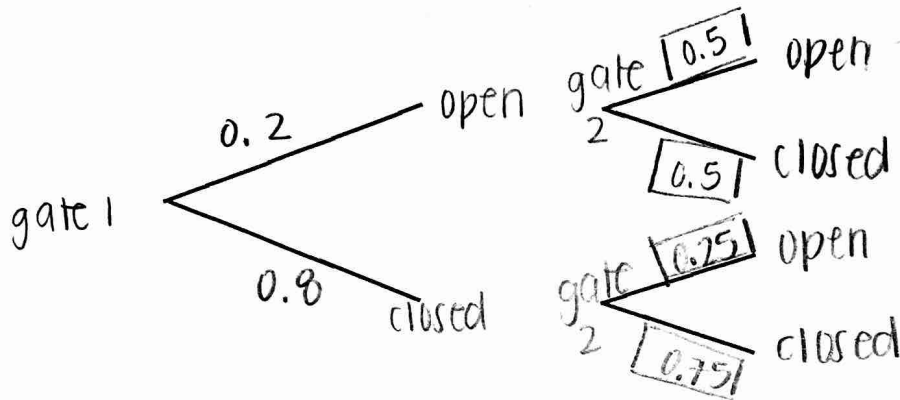
**Probability: Everyday Decisions Based on Probabilities**  
 II.B Student Activity Sheet 5: Probability in Games

Victoria is playing a new video game in which the object is to find hidden treasures. To do so, she must travel through several levels, clashing with guards and watchdogs. In one part of the journey, Victoria must pass through two gates (Gate 1, then Gate 2) to get to the next level.

- The chance that Gate 1 is open is 20%.
- The chance that Gate 2 is open is 30%.
- The game designer has programmed the gates so that the probability of both being open at the same time is 0.1.

probabilities  
 both gates open  
 $(0.2)(x) = 0.1$   
 $x = 0.5$

1. Draw a tree diagram to represent the situation.



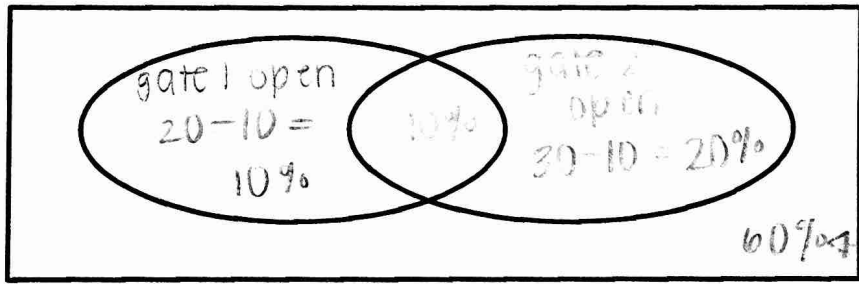
need to solve for these!!

gate 1 open, gate 2 closed  
 $1 - 0.5 = 0.5$

gate 1 closed, gate 2 open  
 $1 - 0.75 = 0.25$

both gates closed  
 $(0.8)(x) = 0.6$   
 $x = 0.75$

2. Draw a Venn Diagram to represent the situation.

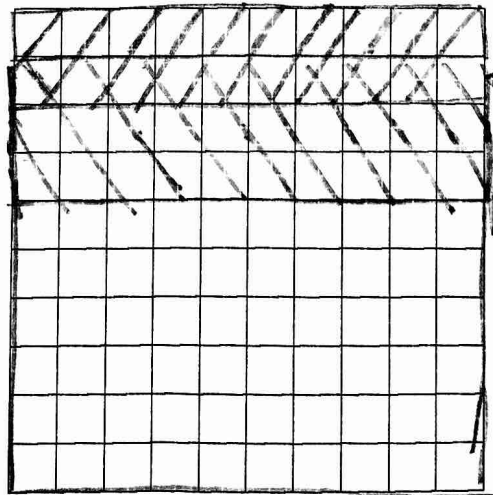


start w/ this

both gates closed

3. Draw an Area Model to represent the situation.

- gate 1 open
- gate 2 open
- neither gate open



both gates open

4. What is the probability that both gates are open when Victoria reaches this part of the game?  
Explain your reasoning.

The game was programmed so that both gates are open 10% of the time. This is shown in the intersection of both the Venn diagram & the area model.

5. What is the probability that only Gate 1 is open when Victoria reaches this part of the game?  
Explain your reasoning.

$P(\text{only gate 1 open}) = 10\%$ . Since gate 1 and gate 2 can be open at the same time 10% of the time & gate 1 is open 20% of the time  $\rightarrow$  only gate 1 =  $20 - 10 = 10\%$ .

6. What is the probability that only Gate 2 is open when Victoria reaches this part of the game?  
Explain your reasoning.

$$P(\text{only gate 2}) = P(\text{gate 2}) - P(\text{both gates}) = 30 - 10 = 20\%$$

7. What is the probability that neither gate is open when Victoria reaches this part of the game?  
Explain your reasoning.

$$P(\text{neither gate open}) = 60\% \quad \left( \begin{array}{l} \text{use Venn diagram} \\ 100 - (10 + 10 + 20) = 100 - 40\% \end{array} \right)$$

8. What is the probability that Victoria finds exactly one gate open?

$$\begin{aligned} P(\text{only gate 1}) &= 10\% \\ + P(\text{only gate 2}) &= 20\% \\ \hline &= 30\% \end{aligned}$$

OR

$$\begin{aligned} &P(\text{only gate 1}) \\ + &P(\text{both gates open}) \\ + &P(\text{only gate 2}) \end{aligned}$$

