

## Probability: Everyday Decisions Based on Probabilities

### Student Activity Sheet 7: Stocks and Risk

Javier will be a senior next year in high school. To celebrate his graduation, his grandmother gave him a sizeable amount of money. Since he has scholarships for college, Javier decided to investigate investing the money in stocks. He talked to a consultant, who explained some of her investment types and their returns as compared to the market average. Javier’s choices were to invest in high- or low-capital stock and domestic or international.

The following is a summary of the data for the last quarter:

	Domestic	International
High-capital stock	250	40
Low-capital stock	200	10
High-capital stock with below-average showing	40	6
Low-capital stock with below-average showing	15	4

1. Draw a Venn diagram and a tree diagram of the data.
2. Using the data, estimate the probability that a high-cap domestic stock performs at or above market average.
3. What type of stock would you suggest Javier invest in if he wants to limit his risk of the stock performing below market average. Why?
4. Contrast the performance of international and domestic stocks as compared to the market average.
5. Write three facts that help Javier decide in which types of stocks to invest.

Did you use the Venn diagram or the tree diagram to find the facts? Which was most helpful? Why?

6. **REFLECTION:** List the advantages and disadvantages of the types of models used in this problem.

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7. **EXTENSION:** Javier decides to invest \$100 in high-cap domestic stocks. He narrows his choice to stock in Txtel or stock in TxMart, both of which have the same price today. Txtel is a growth stock in the technology sector. It tends to be more volatile. Based on financial analysis, this stock may go down \$10 with a probability of 0.4 or up \$8 with a probability of 0.6 in the next quarter. TxMart is a value stock in the domestic goods sector. It is projected to drop \$4 with a probability of 0.2 or go up \$2 with a probability of 0.8. Which stock do you recommend? Why?
8. **EXTENSION:** Investigate other applications of decision making in situations involving risk—both situations where the risk is known (that is, you have some sort of data to determine mathematically how likely it is to occur) and situations where risk information is not known ahead of time. Examples include purchasing insurance, increasing or decreasing premiums on insurance, and not being eligible for insurance because of high risks. Prepare a short presentation of your findings to share with the class.