

What is a Stock?

Lesson Summary

What is a Stock? demonstrates to students how they can own parts of public companies by purchasing shares of their stock.

Lesson Objectives

- Define and give examples of: common stock, investor, risk, public corporation, private company, preferred stock, earnings, and dividends.
- Explain why there is risk involved in stock ownership.
- Make decisions as a group on the benefits of investing in stocks verses costs and/or loss of use of capital.
- Calculate gain and loss from sample stock sales.
- Explain the differences between common stock and preferred stock.
- Explain how a company will “go public” by issuing an IPO.

NCTM Standards

1A - Understand numbers, ways of representing numbers, relationships among numbers, and number systems.

1B - Understand meanings of operations and how they relate to one another.

1C - Compute fluently and make reasonable estimates.

5C - Develop and evaluate inferences and predictions that are based on data.

6C - Apply and adapt a variety of appropriate strategies to solve problems.

8A - Organize and consolidate mathematical thinking through communication.

8B - Communicate mathematical thinking coherently and clearly to peers, teachers, and others.

9A - Recognize and use connections among mathematical ideas.

Mathematical Strands

	Thinking Algebraically	Students will practice writing algebraic expressions to represent buying and selling stocks.	
	Interpreting Statistics	Students calculate the value of an investment in stock using the formula: Value of Investment = (Number of Shares) (Price per Share)	
	Communicating Quantitative Information	Students graph the value of a portfolio over time.	
	Tackling Complex Problems	Students adjust their portfolios based on the performance of their stocks. In two evaluations, students calculate, reason, and chart the progress of a portfolio.	

THINKING ALGEBRAICALLY

Write equations (=) or inequalities (<, >, ≤, ≥) that represent the problems below. You may use words or symbols, but please be sure you define your variables. Ignore broker's fees in the first three problems.

1. Write an equation to represent the following: You have a total of \$5,460 to spend, and you want to use it all to buy a number (x) of shares that cost \$35.40 per share.
2. Write an inequality to represent the following: You don't want to spend more than \$6,820, and you want to buy y shares of stock that costs \$28.21 per share.
3. Write an inequality to represent the following: You are very interested in a stock whose price per share is \$76.05. You want to invest at least \$2,000, but no more than \$4,500.

In the following problems, write the equations or inequalities to represent each scenario including a broker's fee of 2% on each transaction.

4. You bought 95 shares of a stock at a price of \$ Y for a total cost of \$11,821.80.
5. You bought n shares for \$33.12 a share, which cost you \$8,445.60.
6. You sold 480 shares of stock worth \$ X per share. As a result, \$26,483.52 in cash came back to your portfolio.
7. You bought n shares worth \$48.24 each. You sold the shares at \$49.82, for a loss of \$246.72.
8. Refer to problem number 7. Why did you have a net loss when the stock price increased?

INTERPRETING STATISTICS

1. If you know the number of shares you purchased and the price per share, how would you calculate the total value of your investment?
2. If you bought 3850 shares of DreamWorks Animation SKG, Inc. (DWA), in March for \$26.45 per share, how much did you invest initially?

This is a table of closing prices from March to April for DWA stock.

Month	Price
March	\$26.45
April	\$27.10
May	\$25.95
June	\$22.90
July	\$20.94
August	\$21.19
September	\$24.91
October	\$26.45
November	\$29.23
December	\$29.49
January	\$28.18
February	\$26.85
March	\$30.58
April	\$29.58

3. Make a table that shows how much your investment is worth during each of the months listed in the table. Your table should also include the change in the value of your investment. (There should be a column that shows the profit or loss you would have from selling all the stock on that date.) Ignore any commission (broker's fees).

COMMUNICATING QUANTITATIVE INFORMATION

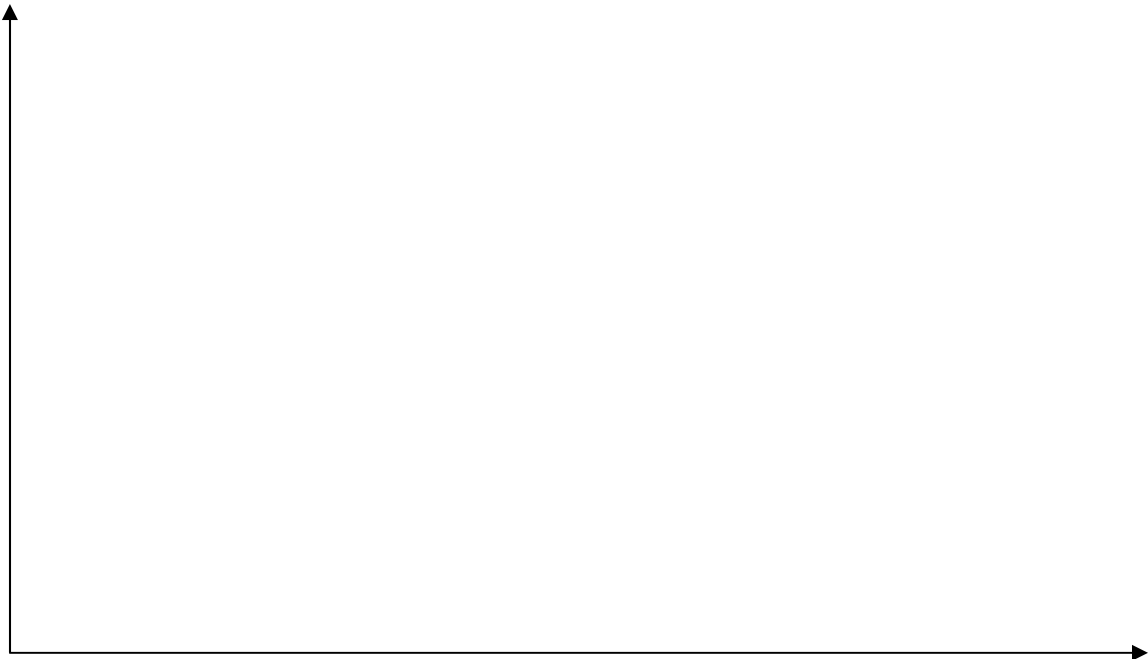
Choose an appropriate scale, and graph the value of the portfolio shown below. Mark important dates on the graph as appropriate.

Group A	
Date	Value
4/10/2007	\$100,000
4/11/2007	\$103,500
4/12/2007	\$102,970
4/13/2007	\$100,340
4/14/2007	\$99,730
4/17/2007	\$98,980
4/18/2007	\$99,102
4/19/2007	\$104,250
4/20/2007	\$103,590
4/21/2007	\$102,111
4/24/2007	\$101,553
4/25/2007	\$103,211
4/26/2007	\$104,006

TACKLING COMPLEX PROBLEMS

Jennifer bought 800 shares of Wild Oats Market Inc. (OATS), at \$16.65 per share on September 21, 2006. On September 28, 2006, she sold 400 shares after its price had dropped to \$16.52. She bought 300 more shares on October 3, 2006, when the price had fallen to \$16.01. She sold all her OATS stock at \$17.09 on October 12, 2006.

1. How much money did Jennifer invest initially in the OATS stock?
2. Immediately after September 28, how many OATS shares did Jennifer still own? What was the value of those shares?
3. How many shares did she own immediately after her purchase on October 3? What was the value of those shares?
4. How many shares did she sell on October 12? How much money were those shares worth?
5. Chart the amount of money Jennifer had invested in Wild Oats Marker Inc. from September 21 to October 12.

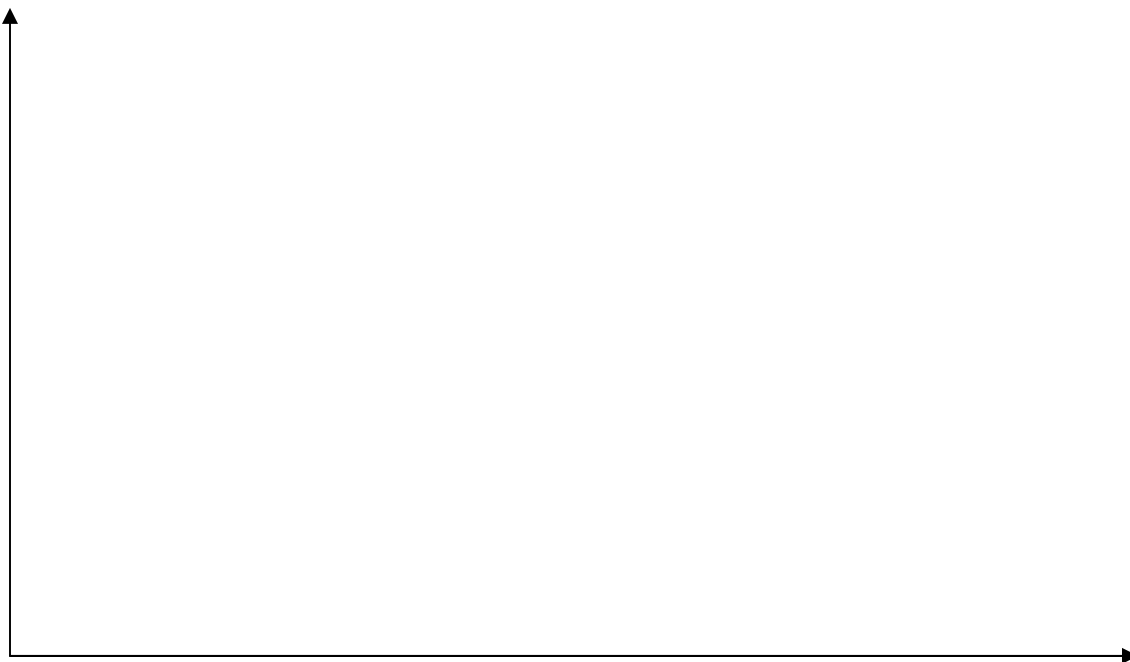


6. How much of a profit/loss did Jennifer make over the course of the investment?

TACKLING COMPLEX PROBLEMS

Jacie's SMG group decided to buy 230 shares of El DuPont de Nemours & Co. (also known as DuPont, symbol: DD), on December 21, 2006 for \$48.98 per share. They sold half their stock on December 27, 2006, when the price had risen to \$49.19. They bought back 200 shares when the price dropped to \$48.05 on January 5, 2007, and then sold all their shares on January 17, 2007 for \$50.72 per share.

1. Ignoring the broker's fees the group paid each time they made a trade, chart the amount of money Jacie's group had invested in DuPont stock from December 21 to January 17. (You might find it helpful to make a table to keep track of the transactions first.)



2. How much of a profit/loss did the group make from their investment?

What is a Stock?

ANSWER KEY

Please Note: 1. Prices included in lesson are not representative of actual market data and are for instructional purposes only. 2. Discrepancies may occur between student responses and the answer keys as a result of how far calculations were taken past the decimal point. In most instances, numbers were rounded from the thousandth or ten thousandth place.

Write equations (=) or inequalities (<, >, ≤, ≥) that represent the problems below. You may use words or symbols, but please be sure you define your variables. Ignore broker's fees in the first three problems.

1. Write an equation to represent the following: You have a total of \$5,460 to spend, and you want to use it all to buy a number (x) of shares that cost \$35.40 per share.

Answer: $x =$ the number of shares purchased

$$\$5,460 = \$35.40(x)$$

$$\text{Solution: } x = 154.24$$

2. Write an inequality to represent the following: You don't want to spend more than \$6,820, and you want to buy y shares of stock that costs \$28.21 per share.

Answer: $y =$ the number of shares purchased

$$\$6,820 \geq \$28.21(y)$$

$$\text{Solution: } y = 241.76$$

3. Write an inequality to represent the following: You are very interested in a stock whose price per share is \$76.05. You want to invest at least \$2,000, but no more than \$4,500.

Answer: $n =$ the number of shares purchased

$$\$2,000 \leq \$76.05(n) \leq \$4,500$$

In the following problems, write the equations or inequalities to represent each scenario including a broker's fee of 2% on each transaction.

4. You bought 95 shares of a stock at a price of \$ Y for a total cost of \$11,821.80.

Answer: $Y =$ cost per share

$$95(\$Y) + (.02)(95)(\$Y) = \$11,821.80$$

OR

$$(1.02)(95(\$Y)) = \$11,821.80$$

$$\text{Solution: } Y = \$122.00$$

5. You bought n shares for \$33.12 a share, which cost you \$8,445.60.

Answer: $n =$ number of shares bought

$$\$33.12(n) + (.02)(\$33.12)(n) = \$8,445.60$$

OR

$$\$33.12(1.02)(n) = \$8,445.60$$

$$\text{Solution: } n = 250.0$$

6. You sold 480 shares of stock worth \$ X per share. As a result, \$26,483.52 in cash came back to your portfolio.

Answer: $X =$ cost per share

$$480(\$X) - (.02)(480)(\$X) = \$26,483.52$$

OR

$$480(.98)(\$X) = \$26,483.52$$

$$\text{Solution: } X = \$56.30$$

7. You bought n shares worth \$48.24 each. You sold the shares at \$49.82, for a loss of \$246.72.

Answer: $n =$ number of shares bought

(money earned when selling shares) - (money spent when buying shares) = gain/loss

$$\$49.82(.98)(n) - \$48.24(1.02)(n) = -\$246.72$$

8. Refer to problem number 7. Why did you have a net loss when the stock price increased?

Answer: Although the stock price increased, the gain earned by sale of the n shares of stock was still less than the amount of money you paid in broker's fees.



INTERPRETING STATISTICS

1. If you know the number of shares you purchased and the price per share, how would you calculate the total value of your investment?

*Answer: (n) =number of shares purchased
(s) =price per share. (t)=total value of investment
 $t = n \times s$*

2. If you bought 3850 shares of DreamWorks Animation SKG, Inc. (DWA), in March for \$26.45 per share, how much did you invest initially?

Answer: $3850 \times \$26.45 = \$101,832.50$

This is a table of closing prices from March to April for DWA stock.

Month	Price
March	\$26.45
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3. Make a table that shows how much your investment is worth during each of the months listed in the table. Your table should also include the change in the value of your investment. (There should be a column that shows the profit or loss you would have from selling all the stock on that date.) Ignore any commission (broker's fees).

Answer:

Month	Price/Share	X	No. of Shares	Value of Investment	Value of Gain/Loss	Profit or Loss
Mar	\$26.45	X	3850	\$101,832.50	-----	
April	\$27.10	X	3850	\$104,335.00	\$2,502.50	Profit
May	\$25.95	X	3850	\$99,907.50	-\$1,925.00	Loss
June	\$22.90	X	3850	\$88,165.00	-\$13,667.50	Loss
July	\$20.94	X	3850	\$80,619.00	-\$21,213.50	Loss
Aug	\$21.19	X	3850	\$81,581.50	-\$20,251.00	Loss
Sep	\$24.91	X	3850	\$95,903.50	-\$5,929.00	Loss
Oct	\$26.45	X	3850	\$101,832.50	\$0.00	Even
Nov	\$29.23	X	3850	\$112,535.50	\$10,703.00	Profit
Dec	\$29.49	X	3850	\$113,536.50	\$11,704.00	Profit
Jan	\$28.18	X	3850	\$108,493.00	\$6,660.50	Profit
Feb	\$26.85	X	3850	\$103,372.50	\$1,540.00	Profit
Mar	\$30.58	X	3850	\$117,733.00	\$15,900.50	Profit
April	\$29.58	X	3850	\$113,883.00	12,050.50	Profit



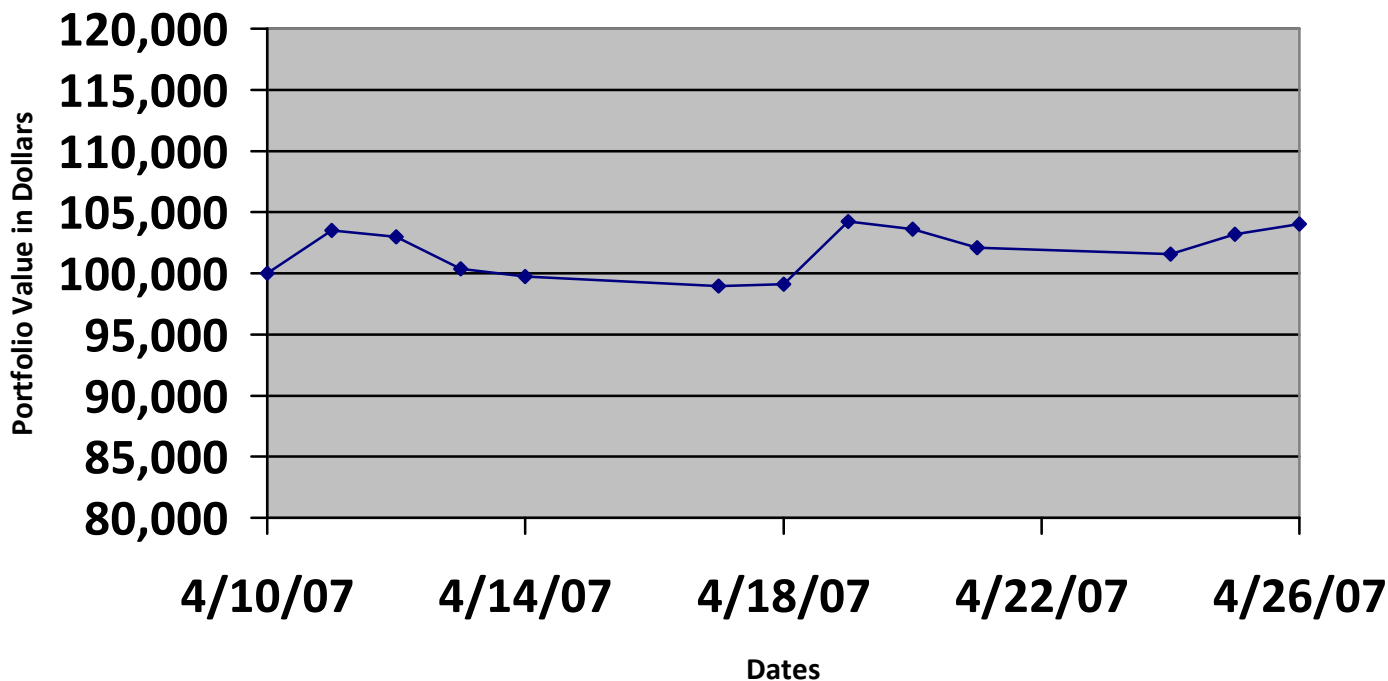
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Answer:

Group A's Portfolio



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1. How much money did Jennifer invest initially in the OATS stock?

Answer: $800 \times \$16.65 = \$13,320.00$

2. Immediately after September 28, how many OATS shares did Jennifer still own? What was the value of those shares?

Answer: $800 - 400 = 400$ shares

Value of those shares = $400 \times \$16.52 = \$6,608.00$

3. How many shares did she own immediately after her purchase on October 3? What was the value of those shares?

Answer: Number of shares owned = $400 + 300 = 700$

Value of those shares = $700 \times \$16.01 = \$11,207.00$

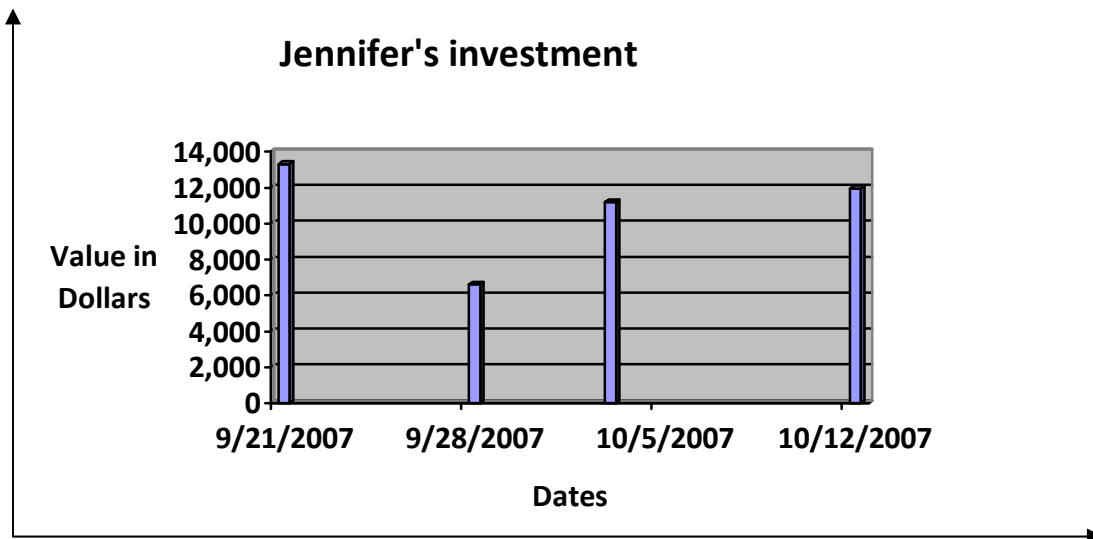
4. How many shares did she sell on October 12? How much money were those shares worth?

Answer: Number of shares sold = 700

Value of those shares = $700 \times \$17.09 = \$11,963.00$

5. Chart the amount of money Jennifer had invested in Wild Oats Marker Inc. from September 21 to October 12.

Answer:



6. How much of a profit/loss did Jennifer make over the course of the investment?

Answer: Jennifer made \$448.00 in profit (not including any commission).

Solution: She bought stock twice: $\$13,320 + \$4,803 = \$18,123$

She sold stock twice: $\$6,608 + \$11,963 = \$18,571$

Net gain = $\$18,571 - \$18,123 = + \$448.00$ in profit.



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Answer Key

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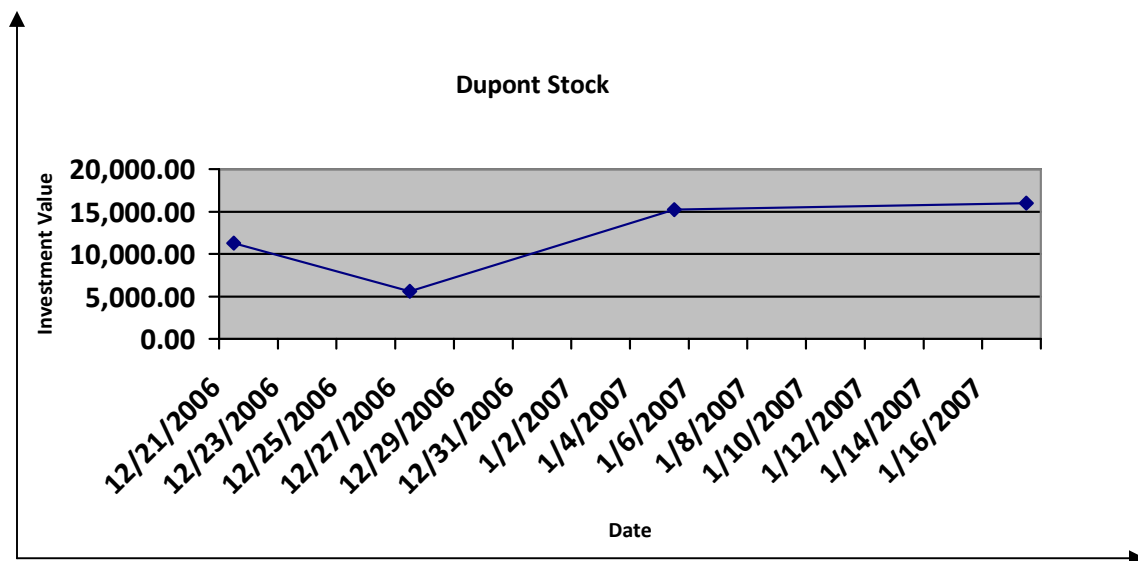
Answers should include the following:

Bought: $230 \times \$48.98 = \$11,265.40$ (12/21)

Sold: $115 \times \$49.19 = \$5,656.85$ (12/27)

Bought: $200 \times \$48.05 = \$9,610.00$ (1/5)

Sold: $315 \times \$50.72 = \$15,976.80$ (1/17)



2. How much of a profit/loss did the group make from their investment?

Answer: Not including any commission, Jacie and her group made a profit of \$758.25

Solution: Jacie's SMG group made two trades in which she bought stock and two trades in which she sold stock.

Cost of purchased stock: $\$11,265.40 + \$9,610.00 = \$20,875.40$

Income from sold stock: $\$5,656.85 + \$15,976.80 = \$21,633.65$

Profit = Income from sold stock - Cost of purchased stock

= $\$21,633.65 - \$20,875.40 = +\$758.25$



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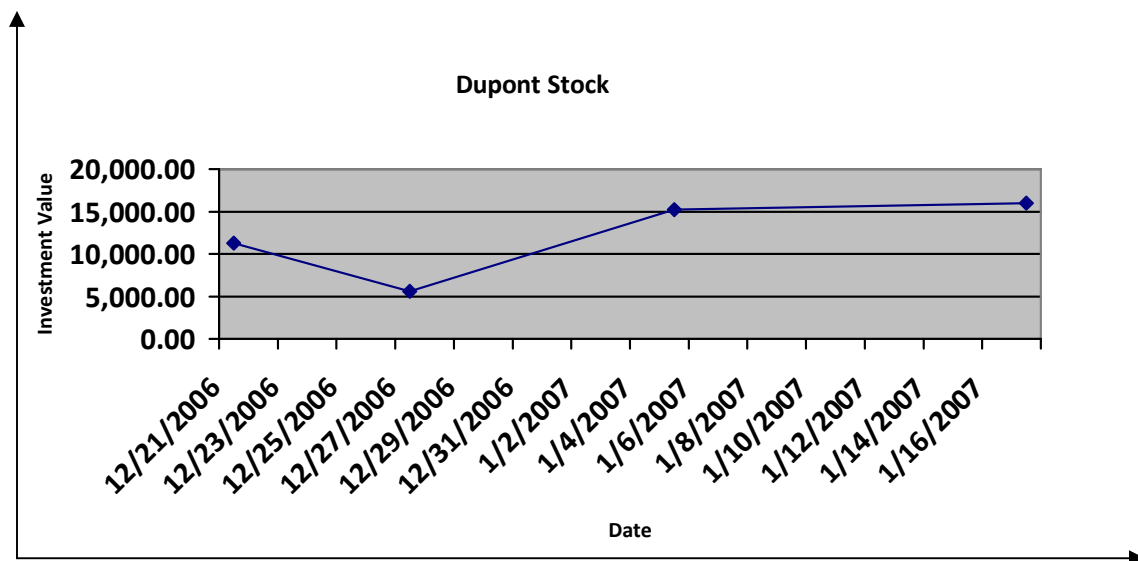
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