

## What is a Company?

### ANSWER KEY

Companies need money to expand and grow. "Going public," selling shares of stock to investors is one way to raise money. Borrowing money from a bank is another way for companies to pay for expansion and growth.

This is a list of interest rates from the past seven years:

2000	2001	2002	2003	2004	2005	2006
8.5%	9.5%	4.75%	4.25%	4.00%	5.25%	7.25%

1. Is better to have a higher interest rate when a company borrows money or to have a lower interest rate? Why?

*Answer: When a company borrows money it is better to have a low interest rate. The lower the interest rate, the lower the amount of money a company has to pay back.*

2. In which years would it have cost companies more to borrow money? In which years would it have cost less? How do you know?

*Answer: In 2000, 2001 & 2006 it would cost the company more to borrow money. It would cost the company less to borrow money 2002, 2003 & 2004.*

3. Write a formula that expresses the interest,  $i$ , that a company will pay on a one-year loan at a specified interest rate,  $r$ .

*Answer:  $r = \text{rate of interest}$ ,  $l = \text{loan amount}$ ,  $i = \text{interest amount}$   
 $r = 5\% (0.05)$ ,  $l = \$100.00$ ,  $i = r \times l$        $0.05 \times \$100.00 = \$5.00$   
 $i = \$5.00$*

## INTERPRETING STATISTICS

Below are the profiles of three companies that are thinking of going public. Each company sells high-end fashion accessories. Based on the information provided, give reasons why an investor might be interested in the company.

	Company A	Company B	Company C
Profits 2002	\$635,000	-	\$1,199,000
Profits 2003	\$654,000	-	\$1,103,000
Profits 2004	\$719,000	-	\$1,048,000
Profits 2005	\$848,000	-	\$1,017,000
Profits 2006	\$992,000	\$2,881,000	\$1,220,000
Company founded in:	Dec 2000	Nov 2005	May 1988

1. Who had greatest profits in 2006?

*Answer: Company B had the greatest profits.*

2. Describe the trend in profits for Company A.

*Answer: Profit for Company A has increased since 2002.*

3. Describe the trend in profits for Company C.

*Answer: Profits for company C had three straight declining years. However, in 2006 there was an increase in company C's profit.*

4. Why can't you describe the trend in profits for Company B?

*Answer: Company B was founded in 2005 and has reported only one year of profits.*

5. Based on the information you took from the profit table above, in which company would you invest? Why?

*Possible answer: Company A has had steady profit increases in the past four years. Some investors might favor Company B because their profits for 2006 were much greater than the other two companies. Because they are a new company it would be considered a risky investment.*

## COMMUNICATING QUANTITATIVE INFORMATION

Dayton Superior Corporation based in Dayton, OH was trying to decide whether to go public in 2006. Pretend you were a junior sales analyst at the company and were invited to give your opinion about what the company should do. Write a memo or prepare a PowerPoint presentation to your boss, the company's CEO, explaining why you think the company should or should not go public.

HINT: Your CEO is very busy, so keep your memo or presentation short and to the point. Use the statistics you think are the most persuasive. Not every piece of information needs to be included. If you choose to use graphs, make sure they are easy to read.

In order to make your recommendations, make notes next to each chart. State what information is presented and how this information helps your boss make the decision to go public or remain private.

### Dayton Superior Corporation Profile

The Dayton Superior Corporation makes metal accessories and forms for keeping concrete and masonry structures in place while under construction. Dayton Superior's products include concrete accessories (anchoring and bracing for walls, positioning steel reinforcing bars, and supporting bridge framework), masonry products (wire support for masonry walls), welded dowel assemblies (metal dowels), paving products, and corrosive-preventing epoxy coatings and other chemicals. The company also provides rents concrete forming and shoring systems to other companies. (source: Hoover's, 2007)

### Basic Information

Fiscal Year-End	December
2005 Sales (mil.)	\$419.0
1-Year Sales Growth	0.1%
2005 Net Income (mil.)	(\$114.7)
2005 Employees	1,800

## COMMUNICATING QUANTITATIVE INFORMATION

### Annual Income (in millions)

Year	Revenue	Gross Profit	Operating Income	Total Net Income
Dec 05	419.0	98.6	(66.2)	(114.7)
Dec 04	418.6	107.7	15.0	(48.4)
Dec 03	377.9	104.3	14.0	(17.1)

### Dayton Superior's Top Competitors

	Dayton Superior	Commercial Metals	Insteel	MMI Products
Annual Sales	419.0	7,555.9	329.5	721.4
Employees	1,800	--	--	2,500
Market Cap (\$ mil.)	0.0	3,065.3	311.1	0.0

Hoover's. (2007). Universal Power Group's financial statements. *Latest Pricings*. Retrieved January 18, 2007, from [http://www.hoovers.com/universal-power-group/--ID\\_153621,ticker\\_--/free-co-fin-factsheet.xhtml](http://www.hoovers.com/universal-power-group/--ID_153621,ticker_--/free-co-fin-factsheet.xhtml)

Based on the notes your analysis of each chart, what is your recommendation to your boss? Choose the three most important pieces of information that you would use to persuade your boss.

*Possible answer: Dayton Superior is a much smaller Co. compared with its top competitors. It ranks third out of four in annual sales. Going public will allow for the opportunity to expand and grow. The total net income has decreased over the past three years. In 2005 the operating income was in the red. Though revenue has increased, gross profit has decreased. By going public this will allow the company to grow, expand and compete with the competition.*

## TACKLING COMPLEX PROBLEMS

1. Company A has decided to go public, hoping to raise \$3 million in capital. In the initial public offering there will be 250,000 shares offered. If all the shares are sold, at what price per share would the company raise its \$3,000,000? At what price would the company raise 110% of its goal?

*Answer: Each share will have to sell for 12.00 for the company to raise \$3,000,000.00. To reach a 110% the company would need to sell each share for \$13.20.*

*Solution: Money hoping to raise  $\div$  Shares offered = price per share.  $3,000,000 \div 250,000 = \$12.00$  (price per share)*

*To find 110% of its goal = price per share  $\times$  1.10 (110%)*

$$12.00 \times 1.10 = \$13.20$$

2. Company C needs to generate \$80,000,000 by going public and having an initial public offering of 1.5 million shares. If all the shares are sold, at what price would the company meet its capital goal?

*Answer:  $80,000,000 \div 1,500,000 = \$53.33$*

3. Company B has decided that go public because they would like to raise \$158,000,000 in capital. They think that an initial public offering of stock would be traded at \$45. At this price, how many shares do they need to offer and sell in order to raise the \$158,000,000?

*Answer:  $158,000,000 \div \$45.00 = 3,511,111.11$  or (3,511,112)*

4. Corporation X has decided to go public, hoping that it will raise at least \$1.25 million dollars. There were 80,000 shares in the initial public offering. Assuming that they were all sold, write an algebraic expression that defines the price per share with which the corporation would be happy.

*Answer:  $1,250,000.00 \div 80,000 = \$15.63$*

*Solution:  $m =$  money for IPO,  $s =$  shares,  $p =$  cost of share.  $m \div s = p$*

## What is a Stock?

### ANSWER KEY

Calculate the gain or loss for each stock. Remember the percentage change in price can be calculated using the following formula:

$$\text{percentage change} = \frac{\text{change in price}}{\text{price bought}}$$

Price Bought	Price Sold	Change in price	Percentage Change in Price
\$36.13	\$37.01	0.88	2.44%
\$12.42	\$12.27	-0.15	-1.21%
\$58.43	\$53.48	-4.95	-8.47%
\$5.39	\$6.02	0.63	11.69%
\$44.95	\$45.99	1.04	2.31%
\$29.83	\$28.75	-1.08	-3.62%
\$9.48	\$15.02	5.54	58.44%
\$22.58	\$22.59	0.01	0.04%

*Solution: Change in Price = price sold – price bought*

$$37.01 - 36.13 = 0.88(\text{change in price})$$

*Change in price ÷ price bought = percent change.  $0.88 \div 36.13 = 2.44\%$*

## THINKING ALGEBRAICALLY

Calculate the commission you will pay for each transaction. The commission is 2% of each transaction. Round your answer to the nearest cent.

Number of Shares	Price per share (bought or sold)	Commission
500	\$22.40	<i>\$244.00</i>
360	\$12.72	<i>\$491.58</i>
70	\$95.48	<i>\$133.67</i>
740	\$41.29	<i>\$611.09</i>
85	\$30.57	<i>\$51.97</i>
1050	\$33.85	<i>\$710.85</i>

*Solution: # of shares x cost share x 0.02 (2%) = commission fee  
500 x \$22.40 = \$11,120.00 x 0.02 = 4224.00*

1. What is the total cost, including commission of buying:

*Solution: no. of shares x cost per share + comm. fee = total cost  
Commission fee = Total value of investment x comm. fee(2% = 0.02)*

390 shares at \$45.92 per share?

*Answer: 390 x 45.92 = 17,908.80*

90 shares at 12.38 per share?

*Answer: 90 x 12.38 = 1,114.20*

786 shares at \$36.00 per share?

*Answer: 786 x 36.00 = 28,296.00*

*Total Investment value: \$17,908.80 + 1,114.20 + 28,296.00 = \$47,319.00*

*Commission fee: 47,319.00 x 0.02 = (946.38)*

## THINKING ALGEBRAICALLY

2. After commission, how much money does your portfolio get back when you sell:

390 shares at \$45.92 per share?

*Answer:  $390 \times 45.92 = \$17,908.80$*

90 shares at 12.38 per share?

*Answer:  $90 \times 12.38 = 1,114.20$*

786 shares at \$36.00 per share?

*Answer:  $786 \times 36.00 = 28,296.00$*

*Once again there is a \$946.38 in commission fees.*

*ANSWER TO QUESTION # 2: It might appear that after selling these shares that one would break even, but the fact is commission fees had to be paid which puts this investor in the whole. The original investment before commission fees is \$47,319.00. Commission fees cost this investor \$1,892.76*



## INTERPRETING STATISTICS

1. If you know the number of shares you've bought and the price per share, how would you calculate the total value of your investment?
2. If you bought **270 shares** of DreamWorks Animation SKG, Inc. (DWA), in March for \$26.45 a share, how much did you invest initially?
3. This is a table of closing prices from March to September 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

Make a table that shows how much your investment is worth during each of the months listed in the table.

*Solution: price per share x no. of shares. ( $26.45 \times 270 = 7,141.50$ )*

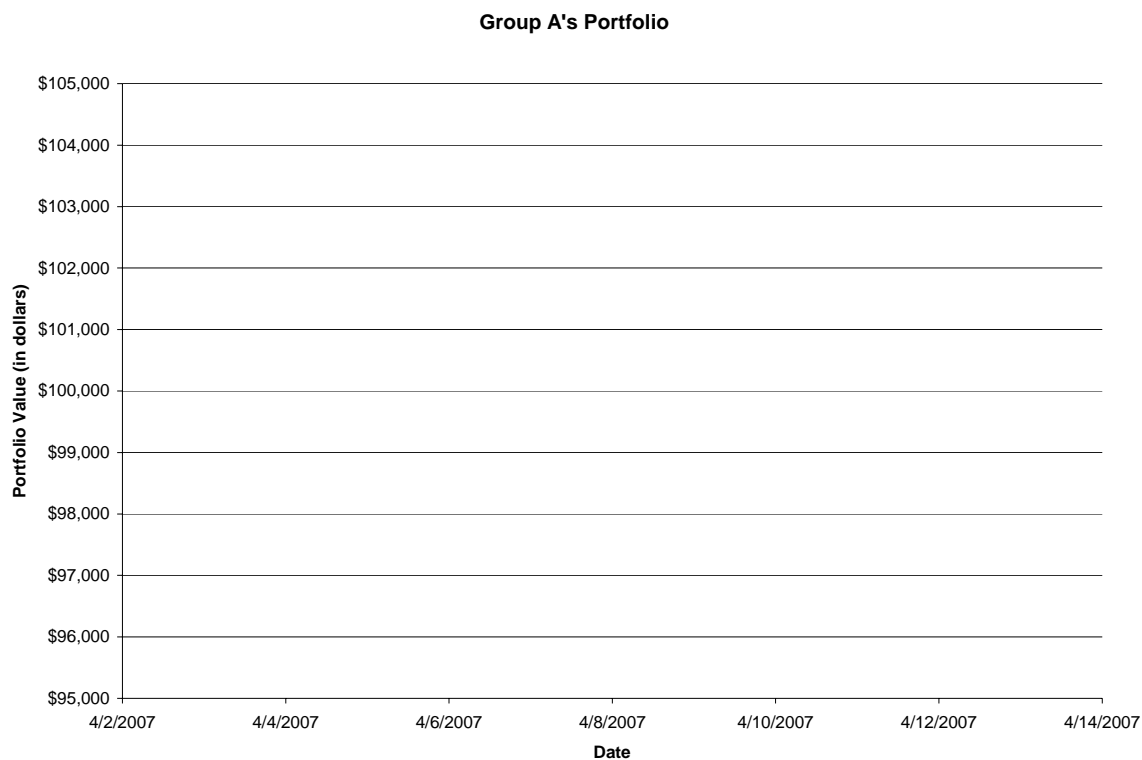
<i>Month</i>	<i>Price</i>	<i>Investment Value</i>
<i>March</i>	<i>\$26.45</i>	<i>\$7,141.50</i>
<i>April</i>	<i>\$27.10</i>	<i>\$7,317.00</i>
<i>May</i>	<i>\$22.95</i>	<i>\$7,006.50</i>
<i>June</i>	<i>\$22.90</i>	<i>\$6,183.00</i>
<i>July</i>	<i>\$20.94</i>	<i>\$5,653.80</i>
<i>August</i>	<i>\$21.19</i>	<i>\$5,721.30</i>
<i>September</i>	<i>\$24.91</i>	<i>\$6,725.70</i>

## COMMUNICATING QUANTITATIVE INFORMATION

Below is a table of a group's SMG portfolio value over the course of 10 days. Use the graph below to chart the value of the portfolio over time.

Group A

Date	Value
4/3/2007	\$100,000
4/4/2007	\$102,430
4/5/2007	\$101,021
4/6/2007	\$99,321
4/9/2007	\$97,230
4/10/2007	\$98,933
4/11/2007	\$99,982
4/12/2007	\$101,222
4/13/2007	\$102,000

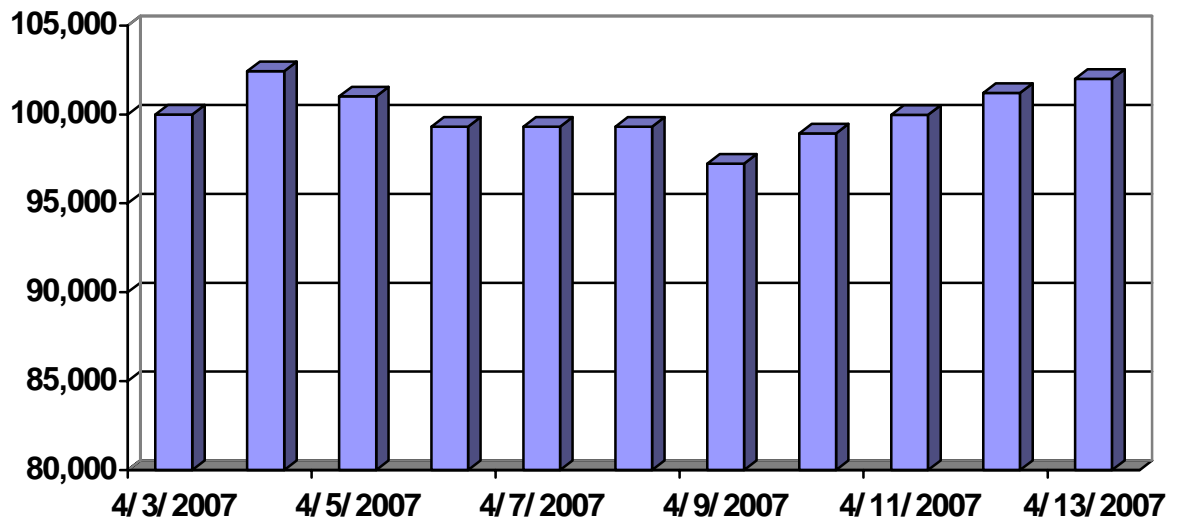


What is a Stock?

Answer Key

X

## COMMUNICATING QUANTITATIVE INFORMATION



## TACKLING COMPLEX PROBLEMS

For each scenario, you are presented with two options. Your job is to tell when you own a greater share of the company. Show mathematically in which company you are the greater share holder by calculating the percentage of the company's share you own.

NOTE: In this activity, numbers are presented in different formats for the purpose of exposing you to multiple representations.

You own 10,000 shares of a company that has 100,000 shares outstanding.

You own 50 shares of a company that has 200 shares outstanding.

In which company are you the greater shareholder?

*Answer:  $10,000 \div 100,000 = 0.10 \times 100 = 10\%$*

*$50 \div 200 = 0.25 \times 100 = 25\%$  (greatest shareholder)*

You own 260,000 shares of Toyota Motor Corporation™, which has 1,600,000,000 shares outstanding.

You own 92,000 shares of Largo Vista Group Ltd, which has 288,830,000 shares outstanding.

In which company are you the greater shareholder?

*Answer:  $260,000 \div 1,600,000,000 = 0.00016 \times 100 = 0.016\%$*

*$92,000 \div 288,830,000 = 0.000319 \times 100 = 0.032\%$*

*This investor has the greatest share holding in Vista Group.*

You own 0.01025% of EMAK Worldwide, Inc. (EMAK).

You own 785 shares of Google Inc. (GOOG), which has 306 million shares outstanding.

In which company are you the greater shareholder?

*Answer:  $EMAK = 0.01025\%$*

*$GOOG \ 785 \div 306,000,000 = 0.00026\%$*

*Greatest share is in EMAK.*

## TACKLING COMPLEX PROBLEMS

Let's use your knowledge of percentages to invest your money. For these examples, you can ignore the commission. The stock prices cited below are not current.

1. If you can only invest a third of your SMG portfolio (\$100,000) in General Electric Company (GE), which is selling shares for \$36.95. How many shares can you buy?

*Answer:  $100,000 \div 3 = \$33,333.33 \div 36.95 = 902.12$*

2. Your team has decided that it wants to invest its money (\$100,000) evenly between 5 industries initially. Within each industry, it will choose four companies. One of those companies is International Business Machines Corporation (IBM), whose current share price is \$96.17. How many shares can you buy for this price?

*Answer:  $100,000 \div 5 = 20,000 \div 4 = 5,000.00$*

*$5,000.00 \div \$96.17 = 52$  shares of IBM.*

3. Your team wants 40% of its initial portfolio (\$100,000) dedicated to companies that develop renewable energy sources and wants to split that 40% equally between five companies. One member wants to buy SunPower Corporation (SPWR), which is selling shares for \$42.48. How many shares can your team afford to purchase?

*Answer:  $(40\%) = 0.40 \times 100,000 = \$40,000 \div 5 = \$8,000.00$*

*$\$8,000.00 \div 42.48 = 188.33$ .*

*They can buy 188 and 1/3 shares of SPWR.*

4. You buy 175 shares of Hexcel Corporation (HXL) for \$16.91 per share. If you have \$97,245 worth of other stocks in your portfolio, what percentage of your portfolio do you have invested in Hexcel? (Assume the entire SMG portfolio is invested in stocks.)

*Answer:  $175 \times 16.91 = \$2,959.25$  (value of HXL in portfolio)*

*$2,959.25 + 97,245 = \$100,204.25$  (value of portfolio including HXL)*

*$2,959.25 \div 100,204.25 = 0.0295 \times 100 = 2.95\%$*

## Identifying Ticker Symbols and Interpreting Stock Quotes

### ANSWER KEY

You need to be good at estimating when you are working with stocks because you are working with so many decimals. Let's practice estimating with the buy orders in the tables below.

First write your estimated price per share and then your estimated number of shares. Then write down your best estimate for the total cost. At the end, go back and figure out how close your estimate is to the actual value! (An example is done for you.)

*Answer: Estimated answers may vary. Actual totals will be exact.*

Price per share	# of shares	Estimated Total	Actual Total	What's the difference?		
Estimate	Estimate					
\$48.75	\$50	195	200	\$10,000	\$9506.25	\$493.75
\$21.32	<i>\$20</i>	594	<i>\$600</i>	<i>\$12,000</i>	<i>\$12,664.08</i>	<i>\$664.08</i>
\$9.76	<i>\$10</i>	10,041	<i>\$10,000</i>	<i>\$100,000</i>	<i>\$98,000.16</i>	<i>\$1,999.84</i>
\$14.68	<i>\$15</i>	98	<i>\$100</i>	<i>\$1,500</i>	<i>\$1,438.16</i>	<i>\$61.36</i>
\$33.02	<i>\$30</i>	4,051	<i>\$4,000</i>	<i>\$120,000</i>	<i>\$133,764.02</i>	<i>\$13,764.02</i>
\$103.78	<i>\$100</i>	1,978	<i>\$2,000</i>	<i>\$200,000</i>	<i>\$205,276.84</i>	<i>\$5,276.84</i>
\$88.97	<i>\$90</i>	71	<i>\$70</i>	<i>\$6,300</i>	<i>\$6,316.87</i>	<i>\$16.87</i>
\$48.69	<i>\$50</i>	52	<i>\$50</i>	<i>\$2,500</i>	<i>\$2,531.88</i>	<i>\$31.88</i>
\$22.08	<i>\$20</i>	395	<i>\$400</i>	<i>\$8,000</i>	<i>\$8,721.60</i>	<i>\$721.60</i>
\$39.42	<i>\$40</i>	810	<i>\$800</i>	<i>\$32,000</i>	<i>\$31,930.20</i>	<i>\$69.80</i>
\$28.73	<i>\$30</i>	152	<i>\$150</i>	<i>\$4,500</i>	<i>\$4,366.96</i>	<i>\$133.04</i>
\$59.46	<i>\$60</i>	214	<i>\$200</i>	<i>\$12,000</i>	<i>\$12,724.44</i>	<i>\$724.44</i>



## THINKING ALGEBRAICALLY

Often closing prices of stocks are reported with four decimal places. Though a tenth or a hundredth of cent might not seem like much, if you own millions of stocks, those fractions of a penny really matter! Here is some practice to help you round decimals to the nearest hundredths place.

*Answer:*

$$\$32.5219 \approx 32.53$$

$$\$87.5292 \approx 87.53$$

$$\$0.24381 \approx 0.24$$

$$\$35.9961 \approx 36.00$$

$$\$36.5332 \approx 36.53$$

$$\$78.6669 \approx 78.67$$

$$\$14.1222 \approx 14.12$$

$$\$48.3452 \approx 48.35$$

$$\$295.6349 \approx 295.63$$

$$\$65.8486 \approx 65.85$$

$$\$43.4521 \approx 43.45$$

$$\$863.7987 \approx 863.80$$

$$\$27.1658 \approx 27.17$$

$$\$338.8948 \approx 338.89$$

$$\$21.0015 \approx 21.00$$

$$\$99.9949 \approx 100.00$$

$$\$46.0096 \approx 46.01$$

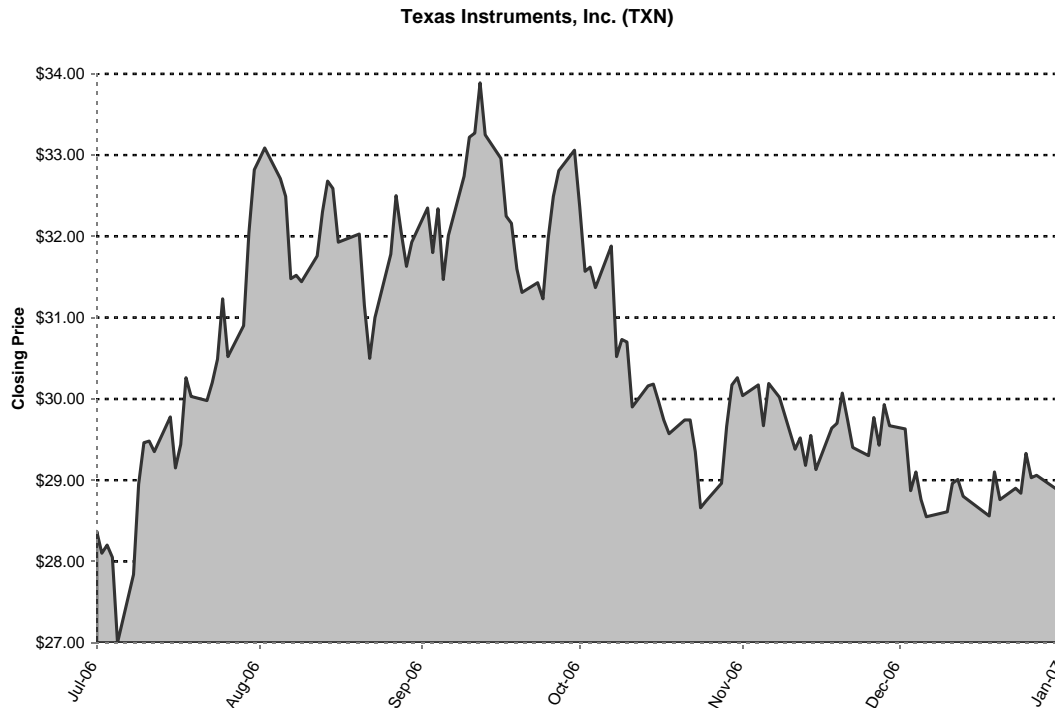
$$\$56.86089 \approx 56.86$$

$$\$32.5672 \approx 32.57$$

$$\$68.0063 \approx 68.01$$

## INTERPRETING STATISTICS

This is a six-month graph of closing prices of Texas Instruments Corporation stock.



If an investor bought the stock in the beginning of August, about how much did they pay?

*Answer: \$33.00*

2. If they sold the stock in the beginning of September, about how much did they sell it for?

*Answer: \$32.25*

3. How much profit/loss was incurred between August and September?

*Answer: Between August & September there was about a \$0.50 loss.*

4. If they had held onto the stock until the beginning of October, how much would they have sold the stock for?

*Answer: If they would have sold the stock at the beginning of October they would sold it for about \$33.00*

5. How much profit/loss was incurred between August and October?

*Answer: The stock price for TXN was about the same in August and October as well. The price would have been close to \$33.00 at the beginning of August and it was also \$33.00 at the beginning of October.*



## COMMUNICATING QUANTITATIVE INFORMATION

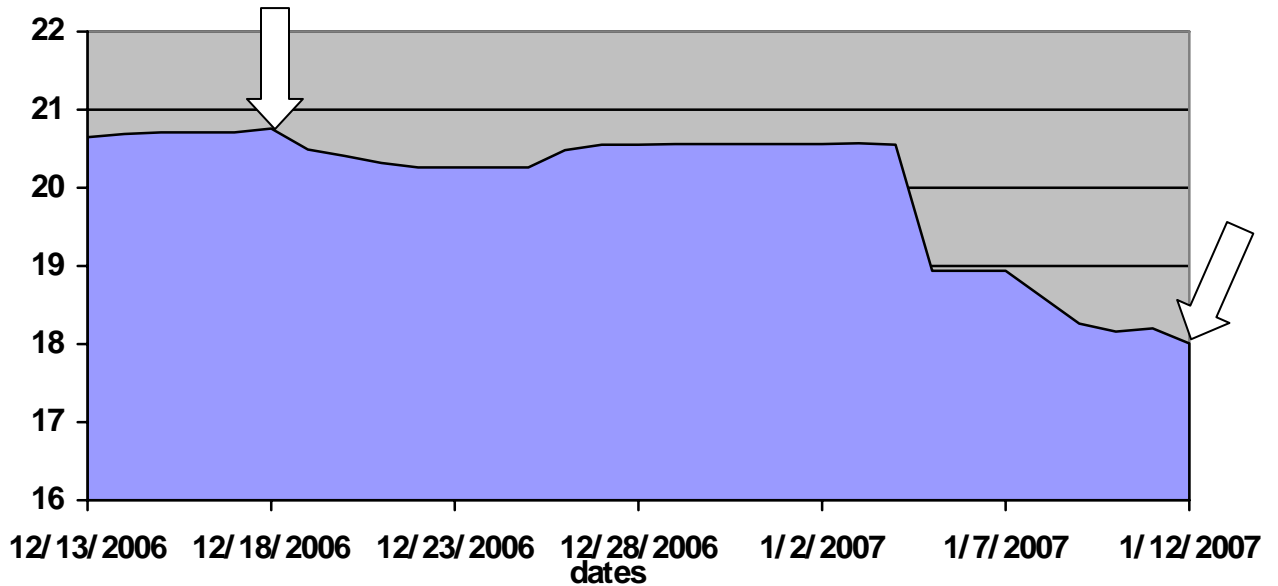
This is a list of closing prices for Motorola Inc (MOT) from December 13, 2006 to January 13, 2007.

Date	Closing Price
12-Jan-07	\$18.01
11-Jan-07	\$18.20
10-Jan-07	\$18.16
9-Jan-07	\$18.26
8-Jan-07	\$18.60
5-Jan-07	\$18.94
4-Jan-07	\$20.55
3-Jan-07	\$20.57
29-Dec-06	\$20.56
28-Dec-06	\$20.55
27-Dec-06	\$20.55
26-Dec-06	\$20.48
22-Dec-06	\$20.26
21-Dec-06	\$20.32
20-Dec-06	\$20.41
19-Dec-06	\$20.49
18-Dec-06	\$20.76
15-Dec-06	\$20.71
14-Dec-06	\$20.69
13-Dec-06	\$20.65

## COMMUNICATING QUANTITATIVE INFORMATION

1. Create a graph that displays the one-month trend of the stock's closing price.

*Answer:*



2. Write a short description of the trend in closing prices.

*Answer: The closing price's (MOT) during this timeframe have decreased by \$2.64.*

3. What is the lowest price shown in the graph? Circle and label this point.

*Answer: \$18.01 (01/12/07)*

4. What is the highest price shown in the graph? Circle and label this point.

*Answer: \$20.76 (12/18/06)*

5. Over which two days did the price of the stock grow the most?

*Answer: Between December 22nd & the 23<sup>rd</sup>. There was a \$0.22 increase.*

## TACKLING COMPLEX PROBLEMS

Calculate the value of the following portfolios:

### Team A

Stocks	Quantity	Price per share	Value
The Coca-Cola Company (KO)	200	\$48.26	<i>\$9,652.00</i>
Google (GOOG)	52	\$489.75	<i>\$25,467.00</i>
3M Company (MMM)	100	\$79.25	<i>\$7,925.00</i>
Ocean Bio-Chem Inc. (OBCI)	6000	\$4.40	<i>\$26,400.00</i>
InSite Vision Incorporated (ISV)	7000	\$1.50	<i>\$10,500.00</i>
Total value of stocks purchased			<i>\$79,944.00</i>
Commission Charged for purchase			<i>\$1,598.88</i>
Cash on hand			<i>\$18,457.12</i>
Current Value of Portfolio			<i>\$81,542.88</i>

### Team B

Stocks	Quantity	Price per share	Value
Exxon Mobile Corporation (XOM)	400	\$73.53	<i>\$29,412.00</i>
Apple Incorporated (AAPL)	650	\$88.50	<i>\$57,525.00</i>
Biogen Idec Incorporated (BIIB)	200	\$51.84	<i>\$10,368.00</i>
American Express Company (AXP)	115	\$58.09	<i>\$6,680.35</i>
Tiffany & Co. (TIF)	320	\$40.04	<i>\$12,812.80</i>
Total value of stocks purchased			<i>\$116,798.15</i>
Commission Charged for purchase			<i>\$2,335.96</i>
Cash on hand			<i>\$ _____</i>
Current Value of Portfolio			<i>\$114,462.19</i>

## What is Risk?

### ANSWER KEY

A stock's beta number is one of many measures of how volatile its price is compared to the market. Market analysts use sophisticated statistical tools to calculate the beta numbers for each stock, but you can get an idea of what Beta measures by comparing the change in the market to the change in price of a stock.

To better understand beta numbers calculate the monthly percentage change in each stock and in the S&P 500 in each table, using the following formula:

$$\text{Percentage change from month a to month b} = \frac{(\text{price in month b}) - (\text{price in month a})}{\text{price in month a}} \cdot 100\%$$

Example:

$$\begin{array}{l} \text{Expedia Percentage} \\ \text{change from} \\ \text{November to December} \end{array} = \frac{20.98 - 18.16}{18.16} \cdot 100\% = 15.53\%$$

	Expedia, Inc. (EXPE)		S & P 500	
	Price	% change	Value	% change
November 2006	\$18.16	15.53%	\$1,400.63	1.26%
December 2006	\$20.98		\$1,418.30	
February 2007	\$21.26	9.03%	\$1,406.82	1.00%
March 2007	\$23.18		\$1,420.86	

	Edison International (EIX)		S & P 500	
	price	% change	Value	% change
November 2006	\$45.98	-1.09%	\$1,400.63	1.26%
December 2006	\$45.48		\$1,418.30	
January 2007	\$44.98	4.49%	\$1,438.24	-2.18%
February 2007	\$47.00		\$1,406.82	

	Eastman Kodak Company (EK)		S & P 500	
	price	% change	Value	% change
December 2006	\$25.80	0.23%	\$1,418.30	1.41%
January 2007	\$25.86		\$1,438.24	
February 2007	\$23.87	-5.32%	\$1,406.82	1.00%
March 2007	\$22.56		\$1,420.86	

Which of the stocks above had percentage changes that were very different from the market? What do you think this means about its Beta number?

*Beta – a measure of an investment's volatility relative to a chosen benchmark. For stocks the benchmark is usually the S&P 500. The beta of the benchmark is always 1.00. So a stock with a beta has experienced up and down movements of roughly the same magnitude as the S&P 500. A stock with a beta of 1.25 is expected to do 25% better than the S&P in an up market and 25% worse in a down market.*

*Possible Answer: Expedia has a percentage change that is much different than the market. This would mean that Expedia's beta number would higher than the markets. Expedia would have a beta number somewhere between 1.08 and 1.15.*



2. How does the chart help explain why the dramatic change occurred, but the stock has a Beta of 1.01?

*The S&P 500 chart shows that the S&P 500 also had a drastic change that cause the market value to drop, but rebounded and its price began to rise. This company's beta would continue to be 1.01 because this company as well as the S&P 500 both had similar experience within the market.*

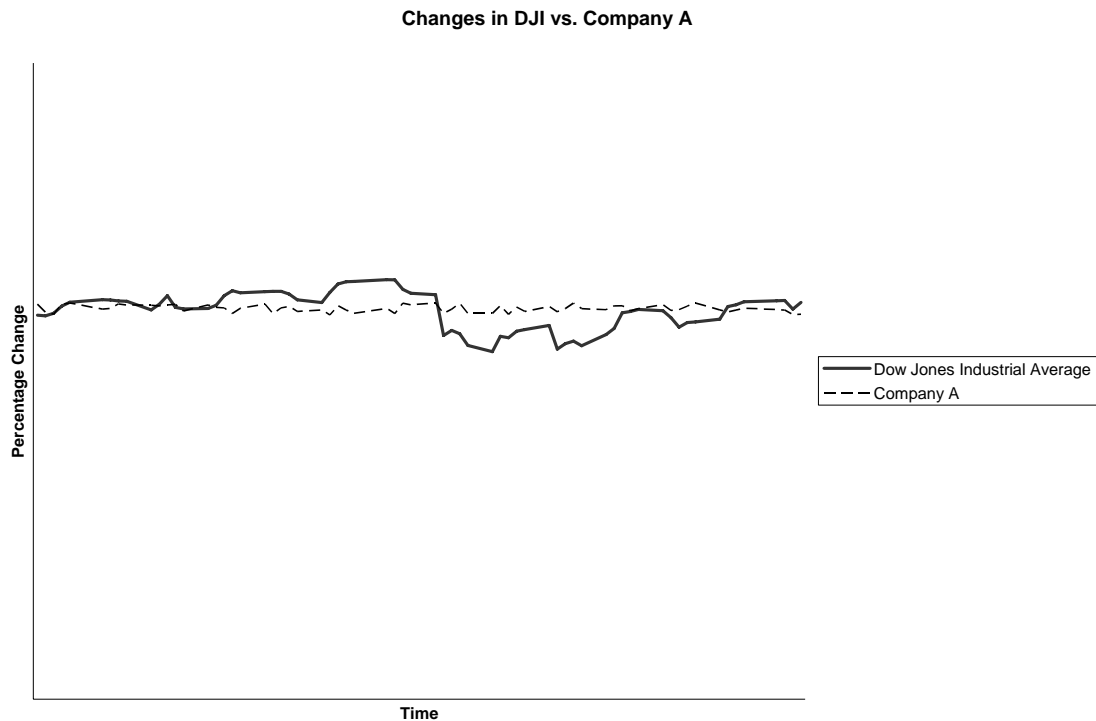
3. Use your knowledge of Beta to explain to your client what may have been going on in the stock market during this same time, and why this fluctuation may not be that "wild" after all.

*This company has a beta of 1.01 because it is performed very closely to that of the S&P 500. This company is usually within a 1% deviation of the S&P 500. In other words, if the S&P 500 is doing well than this company is probably doing well to. However, if the S&P 500 is performing poorly this company is as well.*

## COMMUNICATING QUANTITATIVE INFORMATION

The following graphs illustrate how the relative performance of stocks with different Beta numbers would perform against the market as a whole.

Company A has a Beta of 1.02.

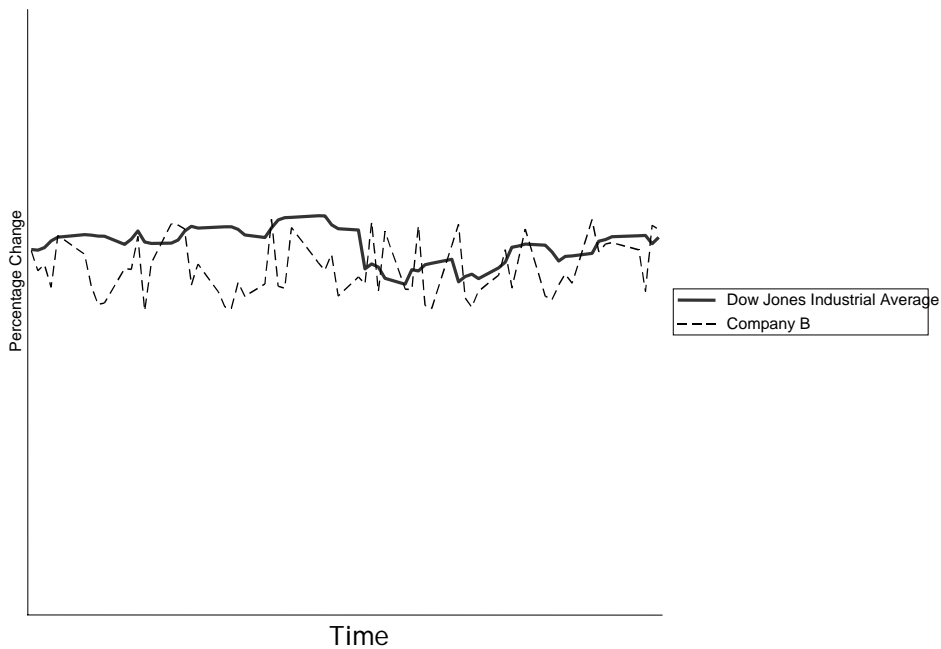




# COMMUNICATING QUANTITATIVE INFORMATION

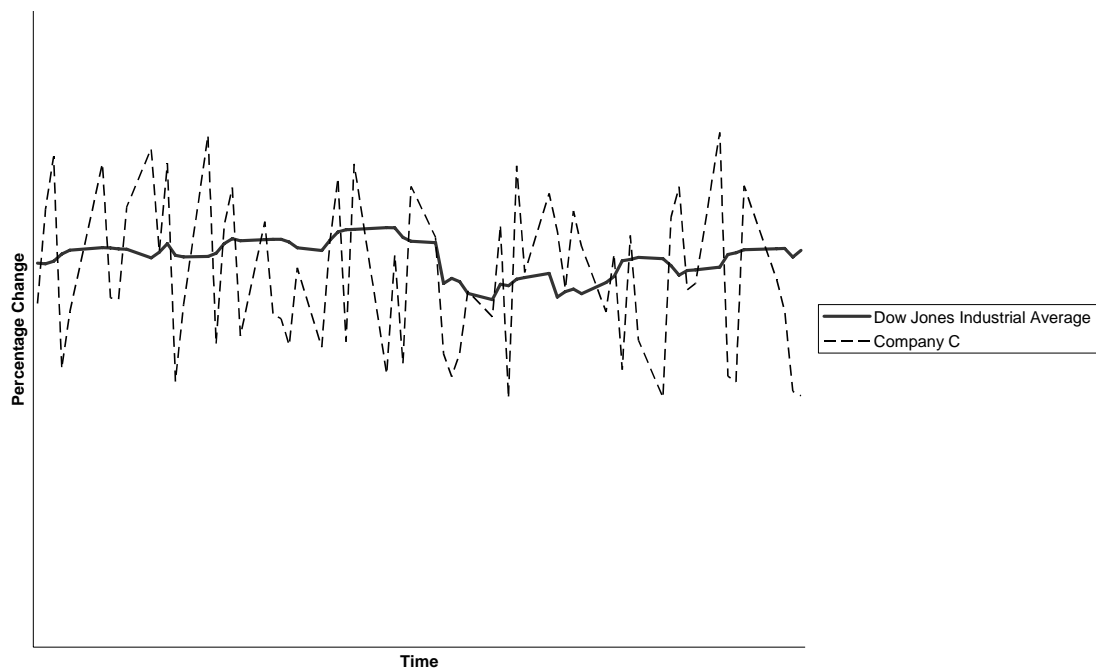
Company B has a Beta of 2.3

Changes in DJI vs. Company B



Company C has a Beta of 5.8

Changes in DJI vs. Company C



## COMMUNICATING QUANTITATIVE INFORMATION

1. Which of the graphs shows a stock whose performance most closely resembles the trend of the Dow Jones Industrial Average?

*Company A most closely resembles the trend of the Dow Jones Industrial Average.*

2. Which of the graphs shows a stock whose performance showed more dramatic changes than the Dow Jones Industrial Average?

*Company C's stock performance has the most dramatic change.*

3. What is different about the graph of a stock's relative performance when it has a Beta close to 1 compared when a stock has a Beta close to 5?

*Company A has a beta of 1.02, which is real close to the DJI Average of 1.01. There closeness is evident by the similarities of there movement on the graph over a period of time.*

*Company C has a beta of 5.8, which compared to the DOW (beta 1.01) is significantly different. Looking at the graph one can see the drastic changes between the two.*

## How Does Money Grow Over Time?

### ANSWER KEY

Because of the properties of compounding rate of return, financial professionals use the rule of 72 to determine quickly about how many years it will take for an investment to double.

To use the rule of seventy-two, take the rate of return and divide it into 72. The answer will tell you in how many years your investment will be worth about twice your initial investment.

$$\text{Years to double investment} = \frac{72}{\text{Rate of return}}$$

Using the rule of 72, estimate the amount of time it will take an investment to double in invested at the specified rate of return.

Rate of Return	Amount of Time	Rate of Return	Amount of Time
3%	<i>24 years</i>	9%	<i>8 years</i>
12%	<i>6 years</i>	24%	<i>3 years</i>
6%	<i>12 years</i>	8%	<i>9 years</i>
2%	<i>36 years</i>	10%	<i>7.2 years</i>
4%	<i>18 years</i>	7%	<i>10.29 years</i>
18%	<i>4 years</i>	5%	<i>14.40 years</i>

**Extension:** How could you tell how many years it would take for an investment to quadruple?

*Answer:  $72 \div \text{rate of return} \times 2 = \text{time it will take for an investment to quadruple.}$*

*Example: rate of return = 9%.  $72 \div 9 = 8 \times 2 = 16$ . It would take 16 years for a investment to quadruple if it had a rate of return of 9%.*



## THINKING ALGEBRAICALLY

In this activity you will learn a quick way to calculate the value of an investment.

1. Complete the following table:

Investor	Principal	Annual rate of Return	Money Earned After One Year	Total Equity
Tom	\$300	6%	<i>\$18</i>	<i>\$318.00</i>
Sean	\$200	3%	<i>\$6</i>	<i>\$206.00</i>
Darryl	\$1,300	2%	<i>\$26</i>	<i>\$1,326.00</i>
Anne	\$180	9%	<i>\$16.20</i>	<i>\$196.20</i>
Suki	\$70	7%	<i>\$4.90</i>	<i>\$74.90</i>
Elena	\$1,000	5%	<i>\$50</i>	<i>\$1,050.00</i>
Nico	\$382	4%	<i>\$7.64</i>	<i>\$389.64</i>
Jennifer	\$4,000	8%	<i>\$320</i>	<i>\$4,320.00</i>
Raul	\$X	4%	<i>\$0.04x</i>	<i>\$0.04x + x</i>
Jason	\$X	7%	<i>\$0.07x</i>	<i>\$0.07x + x</i>

2. Write a description of the calculation you do each time you want to calculate the total Equity

*Answer: Step 1. I converted 6% into a decimal. ( $6 \times 0.01 = 0.06$ )*

*Step 2. To find the money earned after one year, I multiplied 0.06 by the principle.*

*Step 3. To find the total equity, I added the principle to money earned after one year.*

3. Write a formula to express that calculation you just described.

*P = principle, a = annual rate of return, i = interest earned after one year, t = total equity ( $p \times a$ ) + p = Total equity.*

*( $300 \times 0.06$ ) + 300 = 318.00*

1. Show that  $X + rX = X(1+r)$

*Possible answer;  $X = 100, r = 0.02$*

$$100 + (0.02 \times 100) = 100(1 + 0.02) =$$

$$100 + 2 = 100(1.02) =$$

$$102 = 102$$

2. How is this related to calculating the value of an investment?

*Answer: This is related to investing because the algebraic expression above is an example of two different ways for calculating Total Equity.*

## INTERPRETING STATISTICS

Below is a table of the Dow Jones Industrial Average Yearly closing prices from 1997 to 2006. (Source: [www.djindexes.com](http://www.djindexes.com))

Calculate the rate of return for each one-year period. Use the following formula:

$$\text{Rate of return} = \frac{(\text{price}) - (\text{price}_{\text{year\_before}})}{\text{price}_{\text{year\_before}}}$$

**ANSWER:**

<b>Trade</b>	<b>Price</b>	<b>Rate of Return</b>
December 1997	\$7,908.25	%
December 1998	\$9,181.43	16.10%
December 1999	\$11,497.12	25.22%
December 2000	\$10,787.99	-6.17%
December 2001	\$10,021.57	-7.10%
December 2002	\$8,341.63	-16.77%
December 2003	\$10,453.92	25.32%
December 2004	\$10,783.01	3.15%
December 2005	\$10,717.50	-0.61%
December 2006	\$12,463.15	16.29%

## INTERPRETING STATISTICS

This is a table of the federal interest rate for the same years. (Source: [www.federalreserve.gov](http://www.federalreserve.gov))

<b>Year</b>	<b>Interest Rate</b>
1997	8.44%
1998	8.35%
1999	8.00%
2000	9.23%
2001	6.91%
2002	4.67%
2003	4.12%
2004	4.34%
2005	6.19%
2006	7.96%

1. Use the table above to calculate the rate of return of the Dow Jones Industrial Average for each one year period.

2. For which year was the rate of return from the Dow Jones the greatest?

*Answer: The best rate of return was in 2003.*

3. For which year was the rate of return from Dow Jones the smallest?

*Answer: In 2002 the rate of return was -16.77.*

4. For which years would it have been better to invest some money in the stock market rather than all the money in the bank? Why?

*It would have been better to invest some money in the stock market in the following years; 1998, 1999, 2003, & 2006. In each of those years the rate of return was higher in the Dow Jones Industrial Average. More money would have been made in the stock versus keeping it in the bank.*

## COMMUNICATING QUANTITATIVE INFORMATION

When an account says that the interest is compounded, it means that the interest earned will be added to the amount of money you started with, and you will earn interest on the interest.

For example, if you invested \$100 in savings account that had a 5% interest rate that was compounded at the end of each year (compounded annually), you could calculate how much money there would be at the end of each year.

In the first year you will earn  $\$100 \cdot 0.05 = \$5$  in interest. That means at the beginning of the second year, your account will have  $\$100 + \$5 = \$105$  in it. In the second year, you will earn  $\$105 \cdot 0.05 = \$5.25$  in interest, and at the beginning of the third year, your account will have  $\$105 + \$5.25 = \$110.25$  in it.

1. Complete the following table that will show how much you will earn in an account that has a 5% interest rate compounded annually.

Year	Principal	Interest earned	Money in account
1	\$100	\$5	\$105
2	\$105	\$5.25	\$110.25
3	\$110.25	<i>\$5.51</i>	<i>\$115.76</i>
4	<i>\$115.76</i>	<i>\$5.79</i>	<i>\$121.55</i>
5	<i>\$121.55</i>	<i>\$6.07</i>	<i>\$127.62</i>
6	<i>\$127.62</i>	<i>\$6.38</i>	<i>\$134.00</i>
7	<i>\$134.00</i>	<i>\$6.70</i>	<i>\$140.70</i>
8	<i>\$140.77</i>	<i>\$7.03</i>	<i>\$147.06</i>
9	<i>\$147.06</i>	<i>\$7.35</i>	<i>\$154.41</i>



## COMMUNICATING QUANTITATIVE INFORMATION

2. Complete the table below that will show much is earned in an account that starts with \$300 and has a 7% annually compounded interest rate over 5 years.

<b>Year</b>	<b>Principal</b>	<b>Interest earned</b>	<b>Money in account</b>
1	\$300.00	\$21.00	\$321.00
2	<i>\$321.00</i>	<i>\$22.47</i>	<i>\$343.47</i>
3	<i>\$343.47</i>	<i>\$24.04</i>	<i>\$367.51</i>
4	<i>\$367.51</i>	<i>\$25.72</i>	<i>\$393.44</i>
5	<i>\$393.44</i>	<i>\$27.54</i>	<i>\$420.98</i>

## COMMUNICATING QUANTITATIVE INFORMATION

Liz and Dave recently got married. They want to have a baby and have decided they want to set aside money to pay for the baby's schooling. They would like to have a child in two years, and imagine that their child will enroll in college at age 18. They're deciding whether to invest their \$15,000 in a 20-year CD with a fixed annual interest rate of 9% or in a savings account with a fixed annual interest rate of 4%.

1. How much money would they have in the CD account after 1 year?

*Answer: After 1 year they will have \$16,350.00 in the CD account.*

2. How much money would they have in the savings account after 1 year?

*Answer: After 1 year they will have \$15,600.00 in their savings account.*

3. How much money would they have in the CD after 2 years?

*Answer: After 2 years they will have \$17,821.50 in their CD account.*

4. How much money would they have in the savings account after 2 years?

*Answer: After 2 years they will have \$16,224.00 in their savings account.*

Use the following formula to complete the table showing how much money is in each account after each year.

$I = P(1+r)^t$ , where  $I$  is the value of the initial investment,  $P$ , invested over  $t$  years with a rate of return of  $r$ .

*Answer*

Year	Money in CD (9%)	Money in Savings Account (4%)
0	\$15,000.00	\$15,000.00
1	\$16,350.00	\$15,600.00
2	\$17,821.50	\$16,224.00
3	<i>\$19,425.43</i>	\$16,872.96
4	\$21,173.72	\$17,547.88
5	\$23,079.36	<i>\$18,249.79</i>
6	\$25,156.50	\$18,979.79
7	\$27,420.59	\$19,738.98
8	<i>\$29,888.44</i>	\$20,528.54
9	<i>\$32,578.39</i>	\$21,349.68
10	<i>\$35,510.44</i>	\$22,203.66
11	\$38,706.40	\$23,091.81
12	\$42,189.97	\$24,015.48
13	\$45,987.07	<i>\$24,976.09</i>
14	\$50,125.91	\$25,975.15
15	\$54,637.24	\$27,014.15
16	<i>\$59,554.59</i>	<i>\$28,094.71</i>
17	\$17,821.50	<i>\$29,218.49</i>
18	\$70,756.81	\$30,387.25
19	\$77,124.92	\$31,602.74
20	<i>\$84,066.16</i>	<i>\$32,866.84</i>

## COMMUNICATING QUANTITATIVE INFORMATION

1. In which account, does the investment grow at a faster rate?

*Answer: The investment grows faster in the CD account.*

2. Between what two years does the CD account reach a value of \$30,000?

*Answer: The CD account reaches \$30,000 between years 8 & 9.*

3. Between what two years does the savings account reach the same value?

*Answer: The savings account reaches \$30,000 between years 17 & 18.*

Pretend you were Liz and Dave's financial advisor. Prepare a brief talk (2-4 minutes) about how their investment would grow in each account. (You may choose to include figures from the table or graph the growth of the initial investment over time.)

*Answers will vary.*

*Possible answer: As you can see from the table, investing in a CD with a 9% fixed interest rate will make a higher rate of return. In 20 years you will have over \$80,000.00 in the CD. With the savings account your total return after 20 years will be a little more than \$30,000.00*

## TACKLING COMPLEX PROBLEMS

Investing early is as important figuring out how much to invest. Because of compound interest, investing early will often make as much money as investing a lot of money in a short period of time.

Consider Rob, a freshman in high school, who sets aside \$5 a week to put aside in a savings account at the end of the year. How much money does Rob invest at the end of each year?

Rob's savings account earns 4% interest. The table below shows the value of Rob's investment and it has been started for you.

Year	New value of Investment	Value of investment after deposit	Interest earned
1	\$0.00	\$260.00	\$10.40
2	\$270.40	\$530.40	\$21.22
3	\$551.62	\$811.62	\$32.46
4	\$844.08	\$1,104.08	\$44.16
5	\$1,148.24	\$1,408.24	\$56.33
6	\$1,464.57	\$1,724.57	\$68.98
7	\$1,793.56	\$2,053.56	\$82.14
8	\$2,135.70	\$2,395.70	\$95.83
9	\$2,491.53	\$2,751.53	\$110.06
10	\$2,861.59	\$3,121.59	\$124.86
...			
33	\$16,954.48	\$17,214.48	\$688.58
34	\$17,903.06	\$18,163.06	\$726.52
35	\$18,889.58	\$19,149.58	\$765.98
36	<i>\$20,445.96</i>	<i>\$20,705.96</i>	<i>\$828.24</i>
37	<i>\$21,534.20</i>	<i>\$21,794.20</i>	<i>\$871.77</i>
38	<i>\$22,665.97</i>	<i>\$22,925.97</i>	<i>\$917.04</i>
39	<i>\$24,760.05</i>	<i>\$25,020.05</i>	<i>\$1,000.80</i>
40	<i>\$26,020.85</i>	<i>\$26,280.85</i>	<i>\$1,051.23</i>

1. Explain how the *Value of the Investment After Deposit* was calculated in year 2.

*Answer: By adding "New Value of the Investment", from year 2, with the 260.00 added each year (savings of \$5.00 per week).*

2. Explain how the *Interest Earned* was calculated in year 2.

*Answer: To calculate the interest for year 2, I multiplied the interest rate (0.04) by "Value of Investment after deposit" (\$530.40).  
 $0.04 \times 530.40 = \$21.22$  (interest earned)*

## TACKLING COMPLEX PROBLEMS

3. Explain how the *New Value of the Investment* was calculated in year 3.

*Answer: The "New Value of Investment" for year three was calculated by adding "Value of Investment after deposit" with the "Interest earned".  $\$530.40 + \$21.22 = \$551.62$*

4. Using your knowledge of the table, complete the last five rows.

*Finished on above table.*

5. How much money will Rob have after 40 years in this account, even if he invests nothing else in the account?

*Answer: Rob will have \$27,332.08 in his account after 40 years.*

*Solution:  $\$26,280.85 + \$1,051.23 = \$27,332.08$*

*Add from year 40: "Value of Investment after deposit" + Interest earned = money Rob will have in his account after 40 years.*

## TACKLING COMPLEX PROBLEMS

A bank is offering three different types of accounts that clients can invest their money in:

A **simple savings** account earns 4% interest annually and the money can be withdrawn at any point without a penalty.

A **CD** (certificate of deposit) earns 9% interest annually, but which you must keep your money in for ten years.

A **mutual fund** that has not guaranteed rate of return, but has had a 11% return for the past four years. You can sell your shares at any point in time.

Lindsay is a 67-year old retiree, who is looking for someplace to keep her retirement savings.

*Possible answer: Lindsay would be best served to keep her money in a simple savings account. Due to her age and the fact that this money is her retirement she has little room for risk.*

Carlos is a 24-year old young college-graduate, who wants to start saving for a house.

*Carlos at the young age of 24 would make the most money in the mutual fund, which has historically gained 11% annually. The mutual fund involves more risk. There is no guarantee that he will continue to gain 11% on this investment, but at 24 he can sustain a loss if his investment does not pan out.*

Melissa is a 30-year old mother, who wants to start a college-fund for her new baby.

*Answer: It would be in Melissa's best interest to take advantage of the CD earning 9%. There is no risk and she does not need this money for a while.*

Which account do you think would appeal most to each of these investors? Why?

*Dividends and Earnings***ANSWER KEY**

Use the formula below to determine the answer to each question. (Assume annual dividends, unless stated otherwise.)

Dividend Payment = (Dividend per share) · (Number of shares)

1. Fred has 500 shares of a stock that is paying \$0.12 in dividends per share annually. What will his total dividend payment be?

*ANSWER:  $0.12 \times 500 = \$60.00$  or  $(0.12)(500) = \$60.00$*

2. Elizabeth owns 850 shares of a stock that is paying a \$0.30 dividend annually. What will her total dividend payment be?

*ANSWER:  $0.30 \times 850 = \$255.00$*

3. Tariq has learned that his 1,200 shares of stock will be paying a \$0.27 dividend at the end of the month. How much money should Tariq expect to receive in a dividend payment?

*ANSWER:  $0.27 \times 1,200 = \$324.00$*

4. LeVan owns shares of a company that will pay \$0.334 dividends per share. If LeVan owns 350 shares, how much will her dividend payment be?

*ANSWER:  $0.334 \times 350 = \$116.90$*

5. Jason owns 430 shares of a stock that will pay \$0.22 dividends at the end of the month. His brother, David, owns 510 shares. How much more money in dividend payments will David receive than Jason?

*ANSWER: Jason's dividends pay him  $(0.22)(430) = \$94.60$*

*David's dividends pay him  $0.22 \times 510 = \$112.20$ . David will receive  $(\$112.20 - \$94.60) = \$17.60$*

6. Suky bought 3,400 shares of a stock that will pay \$0.189 per share in dividends. She wants to use her money to purchase a new computer for \$620. Will she have enough money? (You can ignore any commissions.)

*ANSWER: Yes, Suky will have enough money to buy a new computer.*

*$0.189 \times 3,400 = \$642.60$*

## THINKING ALGEBRAICALLY

7. Eda wants to buy 20 more shares of a stock that are currently valued at \$52.13 per share. She hopes to use her upcoming dividend payment for this purchase. If her 1,750 shares of stock will pay a dividend of \$0.596 per share, will she have enough money? (You can ignore commission.)

*ANSWER:  $0.596 \times 1,750 = \$1,043.00$  (dividend payment).  $20 \times \$52.13 = \$1,042.60$ . Yes, Eda will have enough money (from dividends) to purchase 20 shares of stock.  $\$1,043.00 - \$1,042.60 = \$0.40$*

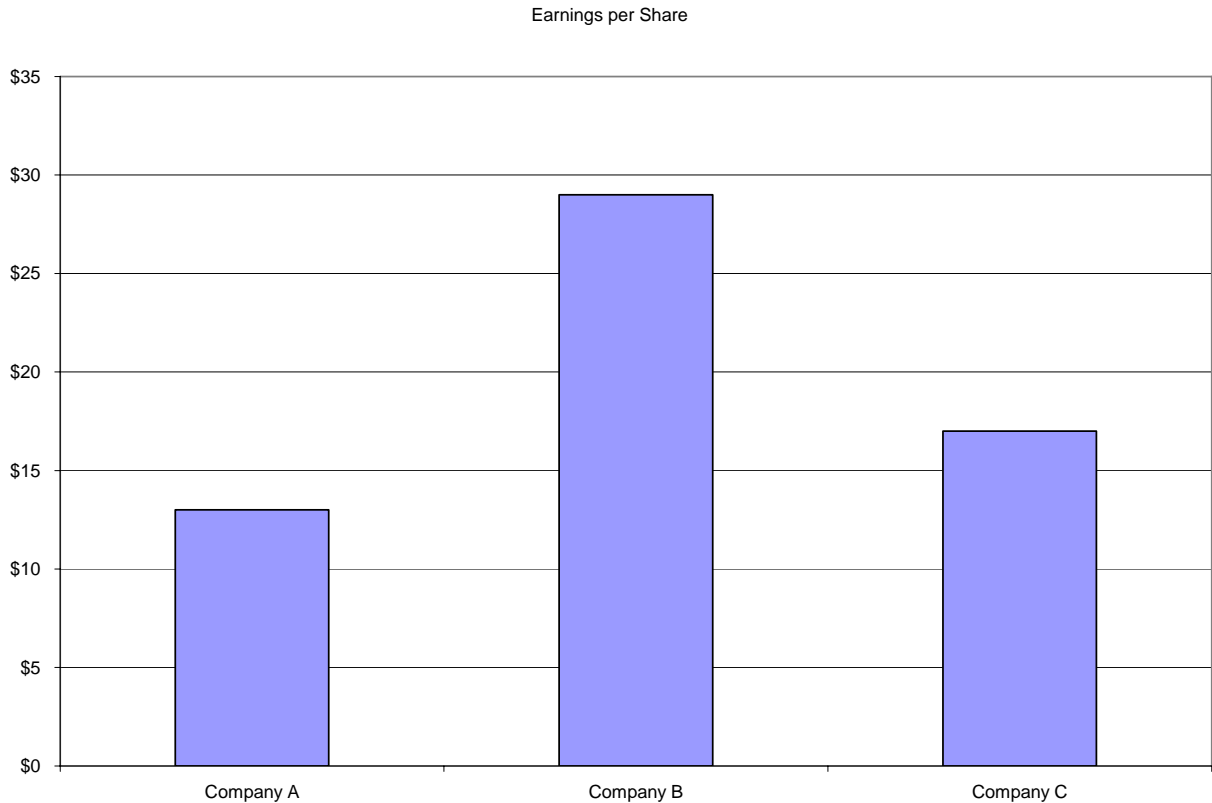
8. Ben received a total dividend payment of \$196.08 for the 860 shares of stock he owned. How much was the dividend per share?

*ANSWER:  $\$196.08/860 = 0.228$*



## INTERPRETING STATISTICS

Below is a chart that shows the earnings per share for three different companies. Use the information provided in the chart to answer the questions below.



1. Which company shows the greatest earnings per share?

*ANSWER: Company B has the greatest earnings per share (\$29.00).*

2. Which company shows the least earnings per share?

*ANSWER: Company A has the lowest earnings per share (\$13.00).*

3. Based on the information above, what stock would you prefer to buy?  
Why?

*POSSIBLE ANSWER: Based on the information above, Company B has the highest earnings per share. However, it is important not to rely on any one financial measure, but to use it in conjunction with statement analysis and other measures.*

## COMMUNICATING QUANTITATIVE INFORMATION

You are a financial advisor and your client has come to you confused about which of two stocks to buy with \$900.

Stock A is a large-cap stock in the consumer goods industry. It costs \$45 per share and has a beta of 1.02.	Stock B is a large-cap stock in the consumer goods industry. It costs \$45 per share and has a beta of 1.02. Stock B also awards quarterly dividends of \$1.25.
---	--

Your client is confused because he has never heard of a dividend.

1. In what ways are the stocks similar?

*ANSWER: The stocks are similar in four ways, 1. they are both large cap companies. 2. They are both in the consumer goods industry. 3. They both have the same price of \$45.00. 4. Each company has a beta of 1.02.*

2. In what way do the two stocks differ?

*ANSWER: Stock B awards quarterly dividends of \$.25. Stock A does not have a dividend.*

3. Write him a short letter explaining how dividends work, and what it would mean if he invested all his money in either stock A or stock B.

*POSSIBLE ANSWER: A dividend is a part a company's profits (earnings) that it pays as money or shares to stockholders. In The Stock Market Game, any dividends received are listed in Transaction History and are included in the portfolio's total equity.*

*Whether, you choose to buy Stock A or Stock B there is no guarantee that the price of the stock will rise or fall. However, by choosing Stock B you will receive money from payment of your quarterly dividend.*

4. Do you know for sure which stock is a better investment? Why or why not?

*Possible answer: Because both of these companies have the same price, industry & beta it would be necessary to research them both further to decide which company is the better investment.*

## TACKLING COMPLEX PROBLEMS

1. On November 30, Susan bought 300 shares of Walt Disney Company (DIS) for \$31.89 a share. On December 13, 2006, Disney paid \$0.31 dividends per share, and on February 12, 2007 she sold the stock for \$33.89 a share.

Ignoring any broker's fees, how much money did she gain or lose on this investment?

*SOLUTION: (# of shares)(cost per share)=(value of investment)  $300 \times \$31.89 = \$9,567.00$ .*

*Dividend payment = (Number of Shares)(Dividend Amount per Share)*

*$300 \times \$0.31 = \$93.00$ . Susan sold the stock  $300 \times \$33.89$  for \$10,167.00*

*ANSWER:  $\$10,167.00 + \$93.00 = \$10,260.00 - 9,567.00 = \$693.00$ . Susan gained \$693.00 from this investment.*

2. On January 23, 2007, Daniel bought 4000 shares of Intel Corporation (INTC) at \$20.55 a share. He sold half his shares on February 6, for \$21.03, one day after Intel Corp. paid a \$0.113 dividend. He sold the remaining shares on February 12, 2007 for \$20.79.

Ignoring any broker's fees, how much money did he gain or lose on this investment?

*SOLUTION: Total Investment = (Number of Shares)(Price per Share)*

*$4000 \times \$20.55 = \$82,200.00$*

*Dividend payment = (Number of Shares)(Dividend Amount per Share)*

*$4000 \times \$0.113 = \$452.00$*

*Sold half of his Shares:  $2000 \times \$21.03 = \$42,060.00$*

*Sold other half of his Shares:  $2000 \times \$20.79 = \$41,580.00$*

*$\$42,060.00 + 41,580.00 + 452.00 = \$84,092.00 - 82,200.00 = \$1,892.00$*

*ANSWER: Daniel gained \$1,892.00 from his investment.*

3. Tom bought 11,600 shares of United Technologies Corporation (UTX) for \$62.87 per share on July 10, 2006. It paid a dividend of \$0.265 on August 16, and on August 17, 2006, he sold 2,500 shares for \$61.85 each. On November 15, 2006, it paid a dividend again, and Tom sold 5,000 of his shares the next day for \$66.76. He sold the remainder of his UTX stock for \$68.58 on February 1, 2007.

Ignoring any broker's fee, how much money did he gain or lose on this investment?

*SOLUTION:  $11,600 \times \$62.87 = \$729,292.00$  (Total Investment)*

*$(11,600)(\$0.265) = \$3,074.00$  (Dividend Payment)*

*$2,500 \times \$61.85 = \$154,625.00$  (Shares Sold)*

*$9100 \times 0.265 = \$2,411.50$  (Dividend Payment)*

*$5,000 \times \$66.76 = \$333,800.00$  (Shares Sold)*

*$4100 \times \$68.58 = \$281,178$  (Shares Sold)*

*(Shares sold) + (Dividend Payments) – Total Investment = Gain/loss*

*$\$769,603.00 + \$5,485.50 = \$775,088.50 - \$729,292.00 = \$45,796.50$*

*ANSWER: Tom gained \$45,796.50 on his investment.*

## TACKLING COMPLEX PROBLEMS

4. On May 30, 2006, Camille bought 25,800 shares of Caterpillar Incorporated (CAT) stock for \$72.16. It paid three dividends each worth \$0.30 over the time she held all the stock. She sold the stock on January 30, 2007 for \$62.88.

If Camille pays a 2% broker's fee on every transaction (except collecting dividends), how much money did she gain or lose on this investment?

*SOLUTION:*

$25,800 \times \$72.16 = \$1,861,728.00$  (Total Investment)

$\$1,861,728.00 \times 0.02 = \$37,234.56$  (Broker Fee)

$25,800 \times 0.30 = \$7,740.00 \times 3 = 23,220.00$  (Three Dividend Payments)

$25,800 \times \$62.88 = \$1,622,304.00$  (All Shares Sold)

$\$1,622,304.00 \times 0.02 = \$32,446.08$  (Broker Fee)

$\$37,234.56 + 32,446.08 = \$69,680.64$  (Total Broker Fee)

$\$1,622,304.00 - \$69,680.64 = \$1,552,623.36$  (Value of Investment – Broker Fee)

$\$1,552,623.36 + \$23,220.00 = 1,575,843.00$  (Value of Investment + Dividend Payment)

$\$1,861,728.00 - \$1,575,843.00 = -\$285,885.00$  (Initial Investment – Value of Investment + Dividend Payment) = Gain or Loss

*ANSWER: Camille has lost \$285,885.00 on her Investment.*

## What is an Exchange/Market?

### ANSWER KEY

Currency	U.S. \$	¥en	Euro	Can \$	U.K. £	AU \$	Swiss Franc
1 U.S. \$ =	1	121.8500	0.7688	1.1714	0.5036	1.2877	1.2475
1 ¥en =	0.008207	1	0.006309	0.009613	0.004133	0.010568	0.010238
1 Euro =	1.3007	158.4962	1	1.5237	0.6551	1.6750	1.6227
1 Can \$ =	0.8537	104.0208	0.6563	1	0.4299	1.0993	1.0650
1 U.K. £ =	1.9856	241.9488	1.5265	2.3260	1	2.5570	2.4771
1 AU \$ =	0.7765	94.6226	0.5970	0.9096	0.3911	1	0.9687
1 Swiss Franc =	0.8016	97.6754	0.6163	0.9390	0.4037	1.0323	1

Use the table above to convert the currency below into the appropriate denomination.

- 1 US dollars = *121,8500 Yen*
- 1 euro = *1.5237 Canadian \$*
- 1 £ = *1.9856 US \$*
- 50 ¥ = *0.5119 Swiss (50 x 0.010238 = 0.5119) Swiss Francs*
- 9,005 Australian dollars = *\$6,992.38 US (9,005 x 0.7765 = 6,992.38) \$ (US)*
- \$100,000 (Australian) = *59,700 euro*
- 6,000 £ = *1,451,692.80 Yen*
- 450,000 Canadian Dollars = *494,685.00\$ (Australian)*
- 74,969.60 Canadian Dollars = *464,001.54\$ (US)*
- 13,738,500 £ = *20,971,820.25 euro*

## INTERPRETING STATISTICS

Below is a table of monthly averages of the value of the Euro (€, the currency used in European Union nations) against the US dollar (USD).

Month	USD per 1 Euro
January	1.21032 USD
February	1.19393 USD
March	1.20284 USD
April	1.22733 USD
May	1.27662 USD
June	1.26606 USD
July	1.26806 USD
August	1.28105 USD
September	1.27274 USD
October	1.26164 USD
November	1.28895 USD
December	1.32013 USD

1. Describe the trend you see in the data above? Did the dollar get weaker against the Euro over one year or stronger? How can you tell?  
*Answer: The U.S. dollar weakened during this timeframe. In January the U.S. dollar was \$1.21 against 1 Euro. In December the U.S. dollar was @ \$1.32 against 1 Euro. In other words, to buy one Euro in January I would need \$1.21 U.S. dollars. In December I would need \$1.32 U.S. dollars to purchase 1 Euro.*
2. How much was a \$100,000 worth in euros in October?  
*Answer:  $\$100,000 \div 1.26164 = 79,261.91$  Euros*
3. How much was \$100,000 worth in euros in November?  
*Answer:  $\$100,000 \div 1.28895 = 77,582.25$  Euros*
4. How much was \$100,000 worth in euros in December?  
*Answer:  $\$100,000 \div 1.32013 = 75,750.12$  Euros*
5. If you had stock worth 68,430€ in February, how much is that worth in US dollars?  
*Answer: (1 euro = 1.19393 USD in Feb.)  $68,430 \times 1.19393 = 81,700.63$   
 $68,430$  euro = \$81,700.63 U.S. dollars.*
6. If you had an investment valued at 12,045€ in March, how much was that worth in USD?  
*Answer: (1 euro = 1.20284)  $12,045 \times 1.20284 = 14,488.21$ .  
 $12,045$  euro's = 14,488.21 U.S. dollars.*
7. If you had 100,000€ in April, how much US currency could you buy?  
*Answer: (1 euro = 1.22733 US dollar)  $100,000 \times 1.22733 = 122,733$   
 $100,000$  euro's = 122,733.00 U.S. dollars*



## COMMUNICATING QUANTITATIVE INFORMATION

Below is a table displaying the exchange rates for US dollars on February 19, 2007. Use this information to answer the questions below.

US Dollar Exchange Rates							
Currency Last Trade	U.S. \$	¥en	Euro	Can \$	U.K. £	AU \$	Swiss Franc
1 U.S. \$ =	1	121.8500	0.7688	1.1714	0.5036	1.2877	1.2475

- How many Euros (€) could you buy with 1 US dollar?  
*Answer: 1 US dollar = 0.7688 Euros.*
- How many Canadian dollars could you buy with 1 US dollar?  
*Answer: U.S. dollar = 1.1714 Canadian dollar.*
- How many Australian dollars could you buy with 20 US dollars?  
*Answer: 20 U.S. dollars = 25.754 Australian. Solution:  $20 \times 1.2877 = 25.754$*
- How many Japanese Yen (¥) could you buy with \$100 US dollars?  
*Answer: 100 U.S. = 12,185. Solution:  $100 \times 121.8500 = 12,185$ .*
- How many Swiss Francs could you buy with 0.80 US dollars?  
*Answer: 0.80 U.S. = 0.998 Swiss. Solution:  $0.80 \times 1.2475 = 0.998$*

Below is a table that shows the currency conversions between major world currencies.

Major Currency Cross Rates							
Currency Last Trade	U.S. \$	¥en	Euro	Can \$	U.K. £	AU \$	Swiss Franc
1 U.S. \$ =	1	121.8500	0.7688	1.1714	0.5036	1.2877	1.2475
1 ¥en =	0.008207	1	0.006309	0.009613	0.004133	0.010568	0.010238
1 Euro =	1.3007	158.4962	1	1.5237	0.6551	1.6750	1.6227
1 Can \$ =	0.8537	104.0208	0.6563	1	0.4299	1.0993	1.0650
1 U.K. £ =	1.9856	241.9488	1.5265	2.3260	1	2.5570	2.4771
1 AU \$ =	0.7765	94.6226	0.5970	0.9096	0.3911	1	0.9687
1 Swiss Franc =	0.8016	97.6754	0.6163	0.9390	0.4037	1.0323	1

(Source: <http://finance.yahoo.com/currency>, February 11, 2007)

- How many Canadian dollars can you buy with 1 Euro?  
*Answer: 1 euro = 1.5237 Canadian. Solution:  $1 \times 1.5237 = 1.5237$*
- How many Australian dollars can you buy with 1 Yen?  
*Answer: 1 yen = 0.010568. Solution:  $1 \times 0.010568 = 0.010568$*

## COMMUNICATING QUANTITATIVE INFORMATION

8. How many Swiss Francs can you buy with 20 Canadian dollars?

*Answer: 20 Canadian = 21.30*

*Solution:  $20 \times 1.0650 = 21.30$*

9. How many British Pounds (£) can you buy with 4,000 Euros (€)?

*Answer: 4,000 Euro's = 2,620.40 British Pounds.*

*Solution:  $4,000 \times 0.6551 = 2,620.40$*

10. How many US dollars can you buy with 1 Euro?

*Answer: 1 euro = 1.3007 U.S*





## TACKLING COMPLEX PROBLEMS

A Japanese investor bought 10,000 shares of Micron Technology, Inc. (MU), at \$16.55 a share.

1. How much did she pay in US dollars?

*Answer:  $10,000 \times 16.55 = \$165,500.00$  in U.S. dollars.*

2. Given the exchange rate below, how much did she pay in Japanese Yen?

US Dollar (\$)	Japanese Yen (¥)
1	117.15

*Answer:  $165,500 \times 117.15 = 19,388,325$  Yen.*

3. About two months later, she decided to sell all her Micron Technology stock, when it was valued at \$15.97 a share. How much was her investment worth in US dollars when she sold it?

*Answer:  $15.97 \times 10,000 = \$159,700.00$  in U.S. dollars.*

4. In American dollars, should the investor have made a profit or taken a loss?

*Answer:  $165,500 - 159,700 = 5,800.00$  in losses.*

5. Given the exchange shown below for the date on which she sold her stock, how much is the investor's investment worth in Japanese Yen?

US Dollar (\$)	Japanese Yen (¥)
1	121.59

*Answer:  $159,700.00 \times 121.59 = 19,417,923$  in Yen*

6. Was this a profit or a loss for the investor?

*$19,417,923 - 19,388,325 = 29,598$  in profit (Yen)*

7. Explain what happened.

*During the time that this Japanese investor owned shares of MU the value of the US dollar strengthened against the Japanese Yen, therefore when he exchanged his US dollars to Yen, he made a profit on his investment even though the MU shares decreased during this time.*



## What is Diversification?

### ANSWER KEY

To calculate percentages, take amount of money in a category (for example, all the money invested in small-cap firms), divide it by the total amount of money in the portfolio, and multiply by 100%.

$$\% \text{ of portfolio invested in a sector} = \frac{\text{money\_invested\_in\_a\_sector}}{\text{total\_value\_of\_investment}} \cdot 100\%$$

Company	Size	Sector	Value
A	Small	Telecommunications	\$1,500
B	Large	Industrial goods	\$31,000
C	Small	Health	\$15,500
D	Mid	Energy	\$5,000
E	Large	Energy	\$27,000
F	mid	Utilities	\$19,000

1. What is the total value of the investment portfolio above?

*Answer: The total value of this portfolio is \$99,000.00.*

2. Using the portfolio above calculate the percentage of the investment in each sector.

*Answer:*

*Telecommunications:  $1,500 \div 99,000 = 1.52\%$*

*\*Solution:  $1,500 \div 99,000 = 0.015 \times 100 = 1.52\%$*

*Industrial Goods:  $31,000 \div 99,000 = 31.31\%$*

*Health:  $15,500 \div 99,000 = 15.66\%$*

*Energy:  $32,000 \div 99,000 = 32.32\%$*

*Utilities:  $19,000 \div 99,000 = 19.19\%$*

3. Calculate the percentage of the investment in each size company.

Answer:

*Small Cap:  $17,000 \div 99,000 = 17.17\%$*

*\*solution:  $1,500 + 15,500 \div 99,000 \times 100 = 17.17\%$*

*Mid Cap:  $24,000 \div 99,000 = 24.24\%$*

*Large Cap:  $58,000 \div 99,000 = 58.59\%$*

## INTERPRETING STATISTICS

Below is the profile of a portfolio's holdings (displayed within industry sectors).

Sector	% holdings
Utilities	0.00
Business services	15.64
Financials	19.74
Telecommunications	4.71
Media	0.00
Consumer goods	8.71
Energy	2.33
Hardware	13.04
Health	5.18
Software	0.00
Consumer services	10.16
Industrial materials	20.48

1. What three sectors does the investor have the most money invested in?

*Answer:*

*Industrial Materials 20.48%, Financials 19.74%, Business Services 15.64%.*

2. Of the sectors in which the investor has money invested, what three sectors does the investor have the least money invested in?

*Answer:*

*Health 5.18%, Telecommunications 4.71%, Energy 2.37%*

3. Would you say that this is a well-diversified portfolio or not well diversified? Why?

*Possible Answer:*

*From the perspective of looking only at sectors this would be diversified.*

*Consideration to Cap size would be beneficial as well. If all of these were small cap young companies there would be a lot of risk involved with this portfolio and might not be considered diversified.*

## INTERPRETING STATISTICS

Below is the profile of another portfolio's holdings (displayed within industry sectors).

Sector	% holdings
Utilities	0.00
Business services	0.00
Financials	95.57
Telecommunications	0.00
Media	0.00
Consumer goods	0.00
Energy	0.00
Hardware	0.00
Health	0.00
Software	0.00
Consumer services	0.00
Industrial materials	4.43

1. What sectors does the investor have the most money invested in?

*Answer: Financials 95.57%*

2. Of the sectors in which the investor has money invested, what sectors does the investor have the least money invested in?

*Answer: Industrial Materials 4.43%*

3. Would you say that this is a well-diversified portfolio or not well diversified? Why?

*Possible Answer:*

*No, 95.57% of all holdings are in the Financials sector.*

## INTERPRETING STATISTICS

Below is the profile of a third portfolio's holdings (displayed within industry sectors).

Sector	% holdings
Utilities	0.00
Business services	19.75
Financials	2.13
Telecommunications	0.00
Media	4.81
Consumer goods	7.38
Energy	0.00
Hardware	4.98
Health	0.84
Software	58.39
Consumer services	1.72
Industrial materials	0.00

1. What sectors does the investor have the most money invested in?

*Answer: Software 58.39%*

2. Of the sectors in which the investor has money invested, what sectors does the investor have the least money invested in?

*Answer: Health 0.84%*

3. Would you say that this is a well-diversified portfolio or not well diversified? Why?

*Possible Answer:*

*I would not consider this a "well diversified" portfolio. Yes, it is invested in 8 different sectors. However, over half of the portfolio is in software.*

4. For what type of investor would you recommend the first portfolio? What about the second portfolio? What about the third?

*Possible Answer: First portfolio would be a conservative investor. The 2<sup>nd</sup> portfolio would be a "risk taker" investor. The third would be a moderate investor.*

## COMMUNICATING QUANTITATIVE INFORMATION

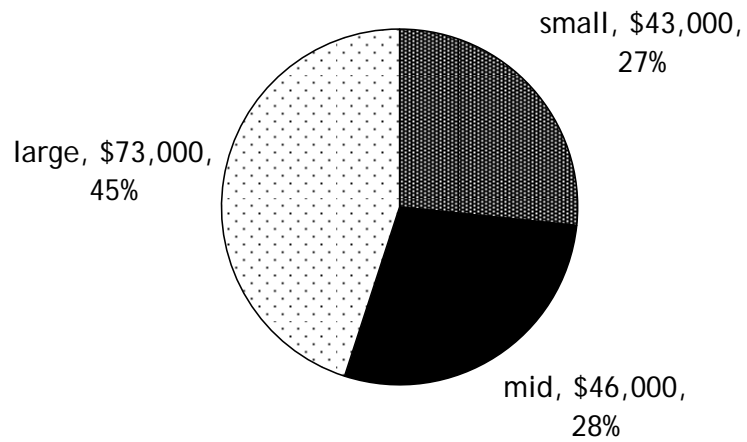
There are many ways to represent a diversified portfolio. There are also different ways to determine if an investment portfolio is diversified or not.

Company	Cap	Sector	Investment Value
A	Small	Media	\$6,000
B	Mid	Software	\$11,000
C	Mid	Consumer goods	\$10,000
D	Small	Consumer goods	\$7,500
E	Large	Utilities	\$36,000
F	Small	Business services	\$12,000
G	Large	Utilities	\$10,000
H	Small	Consumer goods	\$4,500
I	Mid	Energy	\$25,000
J	Large	Health	\$27,000
K	small	media	\$13,000

The following graphs present the information above in different ways. Next to each graph write a brief description of what information each graph presents.

## COMMUNICATING QUANTITATIVE INFORMATION

Size of Companies

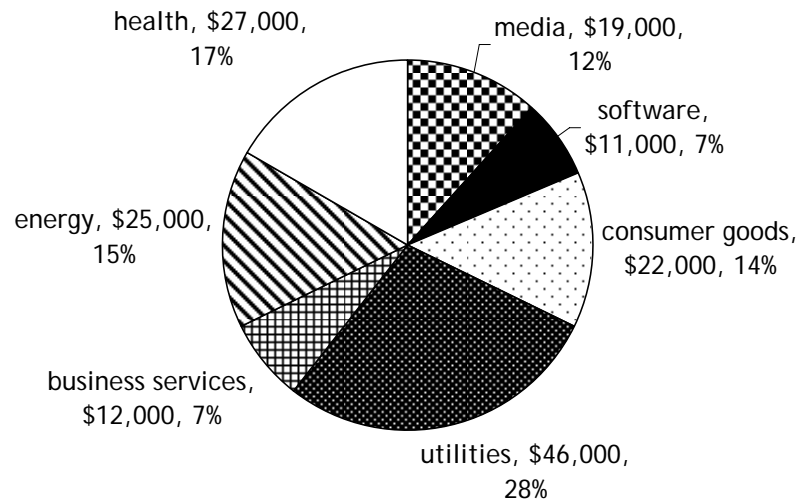


### Description

*Possible answer: This pie chart is distinguishing between small, mid & large cap companies. It displays the percentage of money allocated in the portfolio for each cap size.*

## COMMUNICATING QUANTITATIVE INFORMATION

Investment by Sector

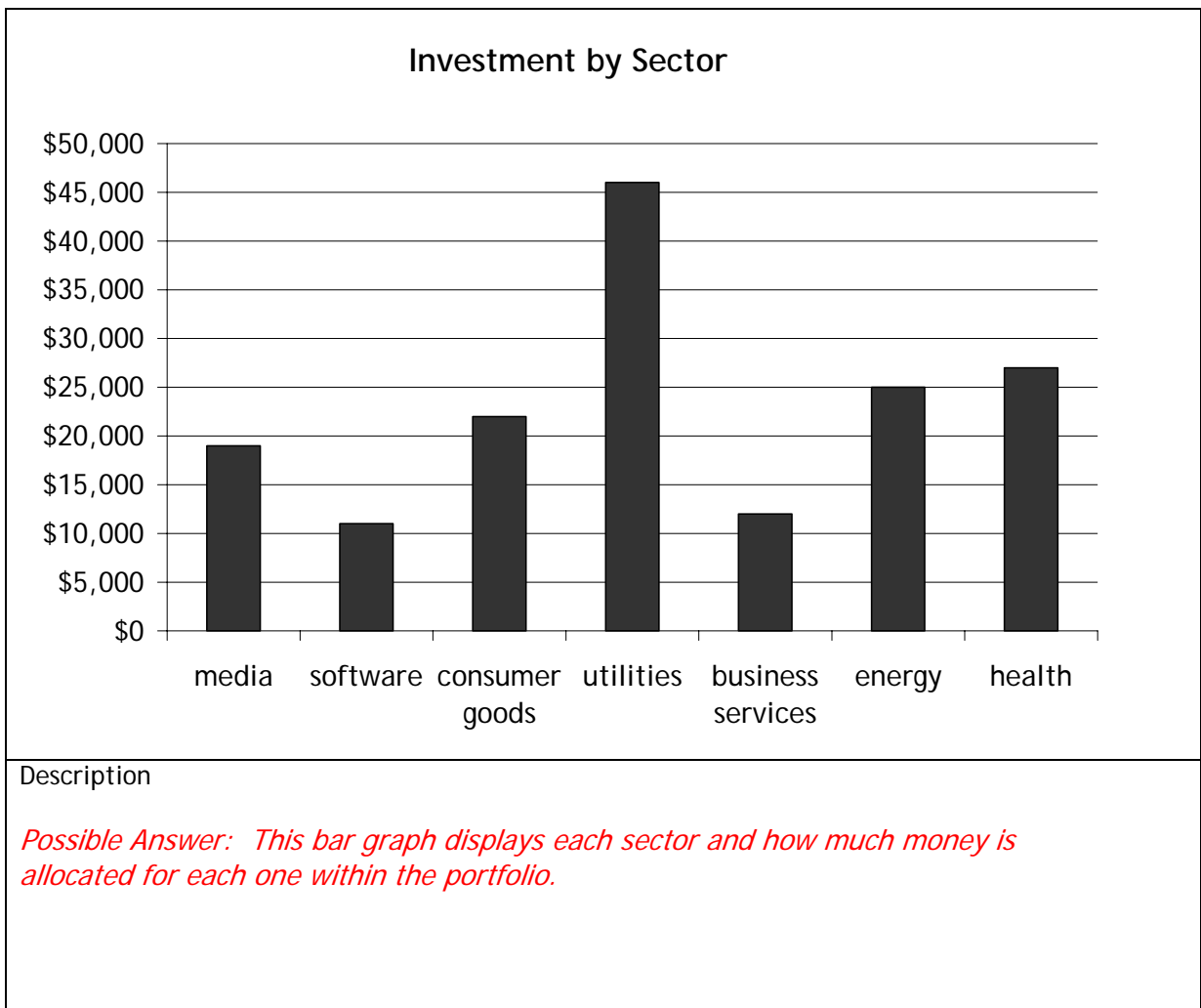


### Description

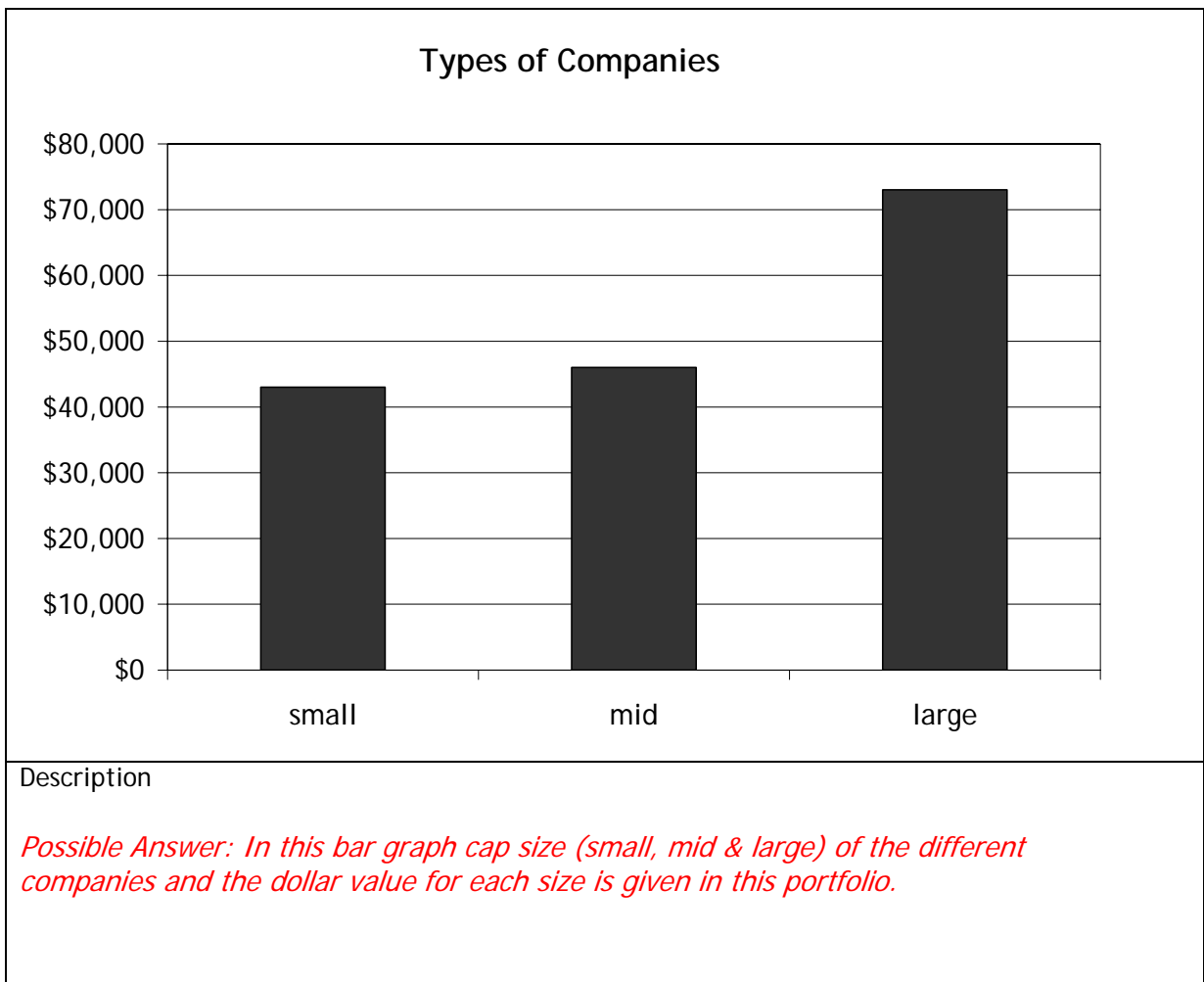
*Possible Answer: This pie chart shows a portfolio divided into sectors. It also gives the percentage of each sector in relationship to the whole portfolio.*



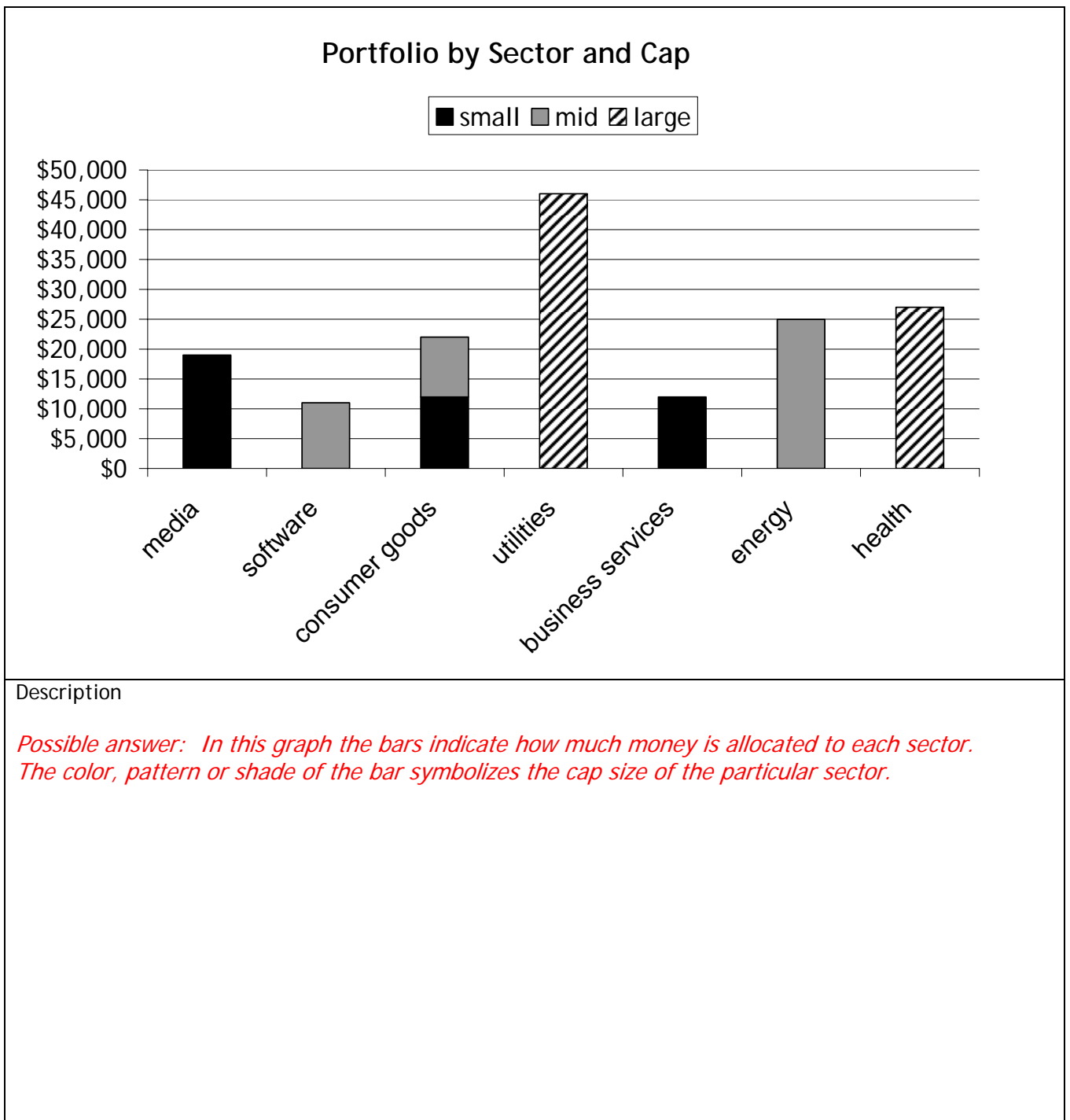
## COMMUNICATING QUANTITATIVE INFORMATION



## COMMUNICATING QUANTITATIVE INFORMATION



## COMMUNICATING QUANTITATIVE INFORMATION



## COMMUNICATING QUANTITATIVE INFORMATION

Below is a practice portfolio. The stocks listed include information on the size of the company, the industry it operates within, and the value of the investment.

Company	Cap size	Sector	Investment Value
A	Mid	Consumer services	\$9,500
B	Mid	Software	\$30,000
C	Small	Software	\$13,500
D	Large	Media	\$20,000
E	Mid	Telecommunications	\$15,000
F	Large	Software	\$12,000

1. On a separate sheet of paper use the information above to create two graphical representations that show the diversification (in terms of both cap size and sector) of the portfolio.
2. On a separate sheet of paper, represent graphically the diversification of your own group's portfolio.

*Answers will vary: Students should use the graphs and charts from the previous pages as examples. Answers should include:*

*Small cap  $\$13,500 \div 100,000 = 0.135 \times 100 = 13.5\%$*

*Mid cap  $\$54,500 \div 100,000 = 0.545 \times 100 = 54.5\%$*

*Large cap  $\$32,000 \div 100,000 = 0.32 \times 100 = 32\%$*

*Consumer services  $9,500 \div 100,000 = 0.095 \times 100 = 9.5\%$*

*Software  $\$55,500 \div 100,000 = 0.555 \times 100 = 55.5\%$*

*Media  $\$20,000 \div 100,000 = 0.20 \times 100 = 20\%$*

*Telecomm.  $\$15,000 \div 100,000 = 0.15 \times 100 = 15\%$*

## TACKLING COMPLEX PROBLEMS

Below is a list of a team's portfolio. They claim that their portfolio is diversified because they have an equal number of stocks from each company. Do you agree?

Stock	Price per Share	Number of Shares	Cap Size
British Airways PLC (BAB)	\$98.74	150	Large
Eddie Bauer Holdings Inc. (EBHI)	\$11.54	150	Small
Handleman Company (HDL)	\$7.14	150	Small
Krispy Kreme Doughnuts Inc. (KKD)	\$10.36	150	Small
Scholastic Corporation (SCHL)	\$31.16	150	Mid
Sunpower Corporation (SPWR)	\$46.81	150	Mid
Symantec Corporation (SYMC)	\$17.04	150	Large
The Stanley Works (SWK)	\$55.81	150	Mid
United Health Group Inc. (UNH)	\$53.73	150	Large

1. What is the total value of their portfolio?

*The total value of this portfolio is \$49,849.50*

2. How much money is invested in:  
Small cap stocks?

*Answer: \$4,356.00*

Mid cap stocks?

*Answer: \$20,067.00*

Large cap stocks

*Answer: \$25,426.50*

What percentage of their investment is in  
Small cap stocks?

*Answer: Small cap stocks = 8.74%*

Mid cap stocks?

*Answer: Mid cap stocks = 40.26%*

Large cap stocks

*Answer: Large cap stocks = 51%*

Would you advise them to rediversify? Why or why not?

## TACKLING COMPLEX PROBLEMS

*Answers will vary. Possible answers may include:*

*First of all it is important to note that buying equal shares of stock for each company does not necessary make a portfolio diversified. What makes a portfolio diversified is having a variety of stocks from different sectors. They might consider reinvesting some of their money in small cap companies.*

★ Can you make recommendations about what stocks they might buy more of and which they might sell?

*Answers will vary. Perhaps sell some of the British Airways (90 shares or so). Also, might sell between 30 & 40 shares each of The Stanley Works, Sun Power Corp., & United health group.*

## What is a Mutual Fund?

### ANSWER KEY

Percentages are a very important part of analyzing financial information. In this exercise, you will find the percentage of the total mutual fund's worth invested in different stock types.

Remember,

$$\frac{\text{part\_of\_investment}}{\text{total\_investment}} \cdot 100\% = \text{percent of mutual fund's worth}$$

*Solution:  $50,000,000 \div 100,000,000 = 0.50 \times 100 = 50\%$*

*Answer:*

#### 1. Mutual Fund A

\$50 million invested in growth stocks	<i>50% invested in growth stocks</i>
\$15 million invested in value stocks	<i>15% invested in value stocks</i>
\$35 million invested in blend stocks	<i>35% invested in blend stocks</i>

#### 2. Mutual Fund B

\$36 million invested in small cap stocks	<i>72% invested in small cap</i>
\$9 million invested in madcap stocks	<i>18% invested in mid cap</i>
\$5 million invested in large cap stocks	<i>10% invested in large cap</i>

#### 3. Mutual Fund C

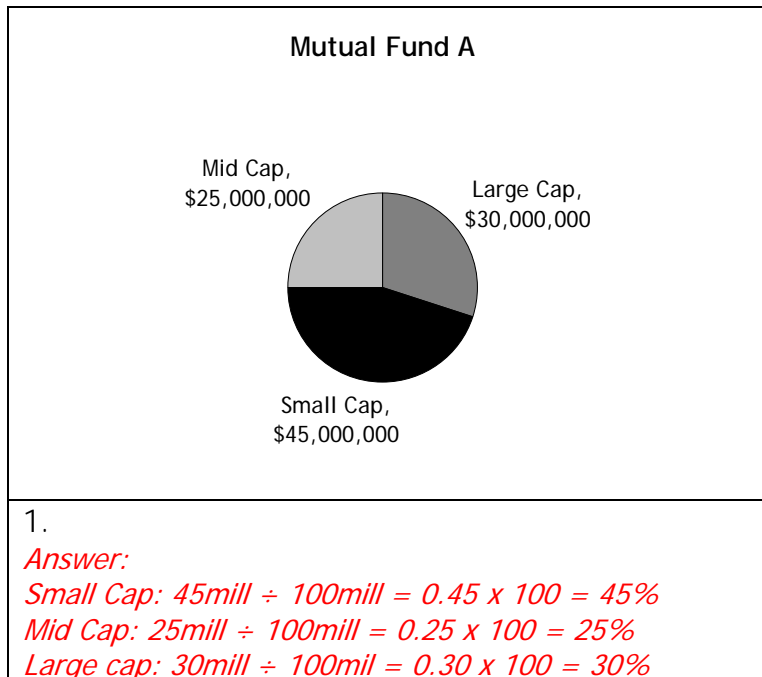
\$46 million invested in utilities	<i>23% invested in utilities</i>
\$81 million invested in services	<i>40.5% invested in services</i>
\$52 million invested in consumer goods	<i>26% invested in consumer goods</i>
\$21 million invested in basic materials	<i>10.5% invested in basic materials</i>

#### 4. Mutual Fund D

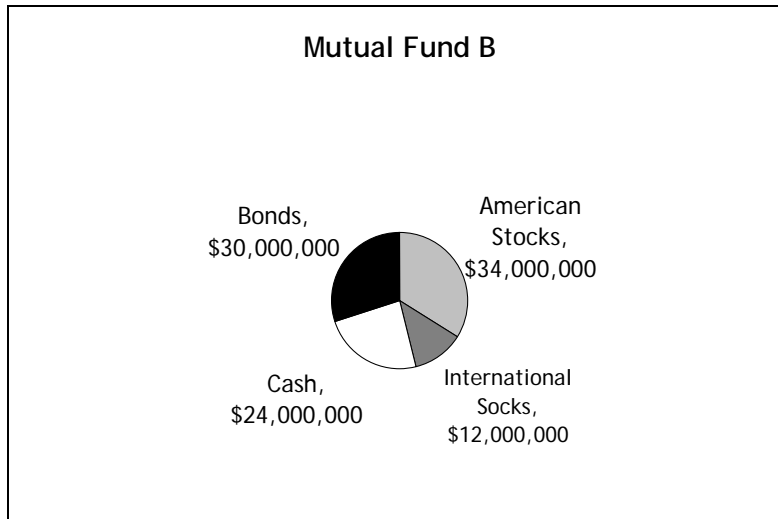
\$120 million invested in health care	<i>52.86% invested in health care</i>
\$57 million invested in technology	<i>25.11% invested in technology</i>
\$12 million invested in financial services	<i>5.29% invested in financial services</i>
\$38 million invested in consumer goods	<i>16.74% invested in consumer good</i>

## INTERPRETING STATISTICS

Investors often turn to graphs for a depiction of the kinds of stocks that comprise a specific mutual fund. The following pie charts represent the assets of different mutual funds. For each mutual fund, calculate what percentage of assets is invested in each category presented in the pie chart.







2.

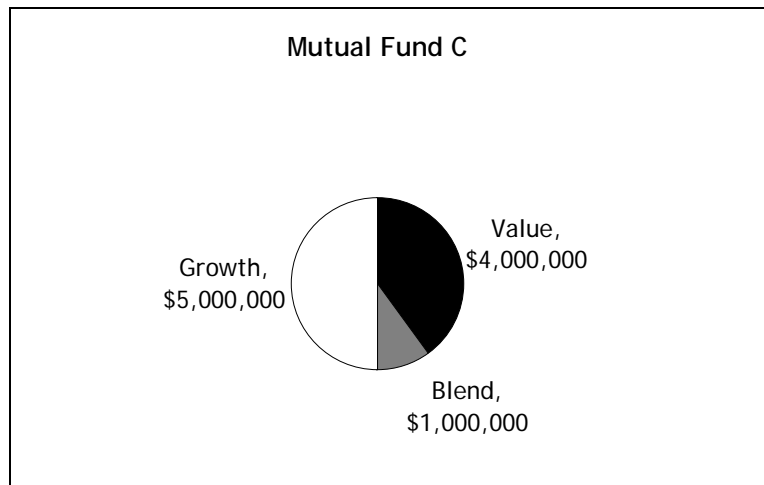
*Answer:*

*Bonds: 30mill ÷ 100mill = 0.30 x 100 = 30%*

*Cash: 24mill ÷ 100mill = 0.24 x 100 = 24%*

*Intrn. Stocks: 12mill ÷ 100mill = 0.12 x 100 = 12%*

*US stocks: 34mill ÷ 100mill = 0.34 x 100 = 34%*



3.

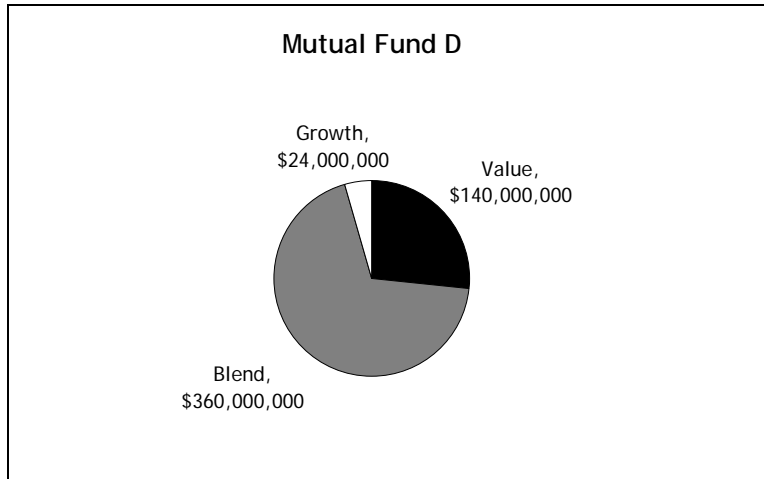
*Answer:*

*Growth: 5mill ÷ 10mill = 0.50 x 100 = 50%*

*Blend: 1mill ÷ 10mill = 0.10 x 100 = 10%*

*Value: 4mill ÷ 10mill = 0.40 x 100 = 40%*

## INTERPRETING STATISTICS



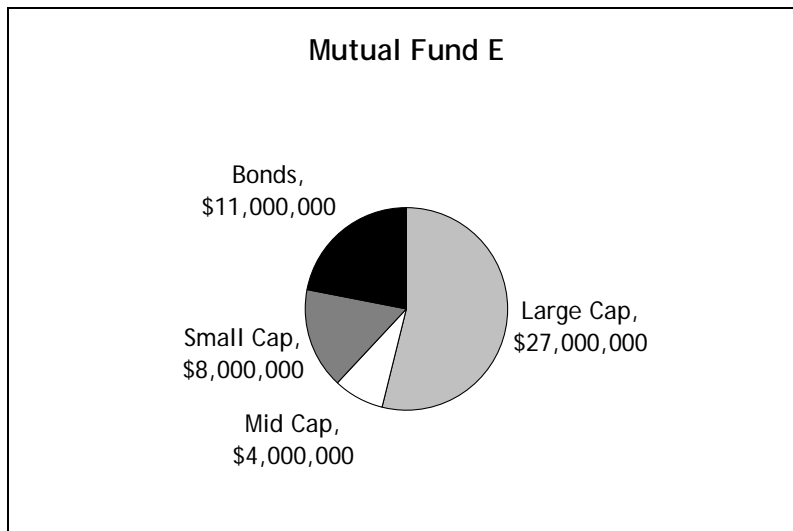
4.

*Answer:*

*Growth: 4.58%*

*Blend: 68.70%*

*Value: 26.72%*



5.

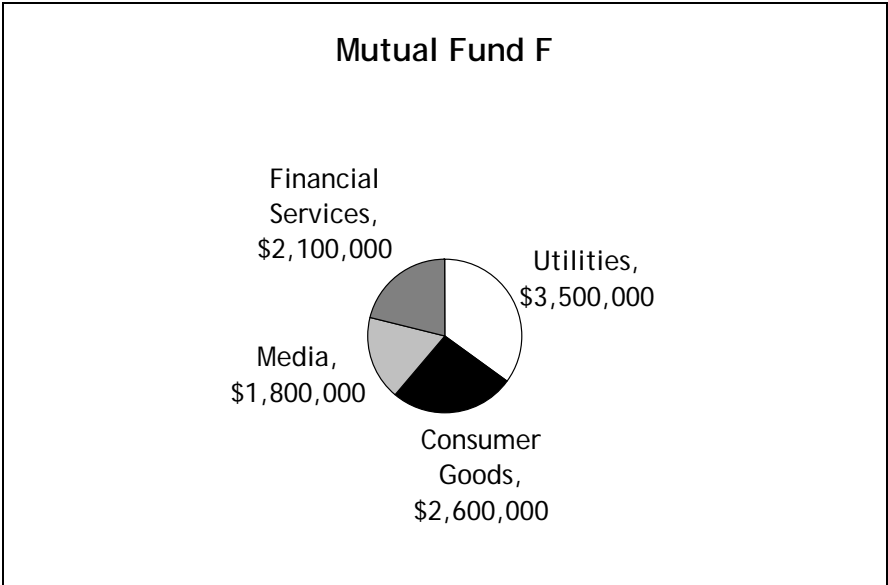
*Answer:*

*Bonds: 22%*

*Small Cap: 16%*

*Mid Cap: 8%*

*Large cap: 54%*

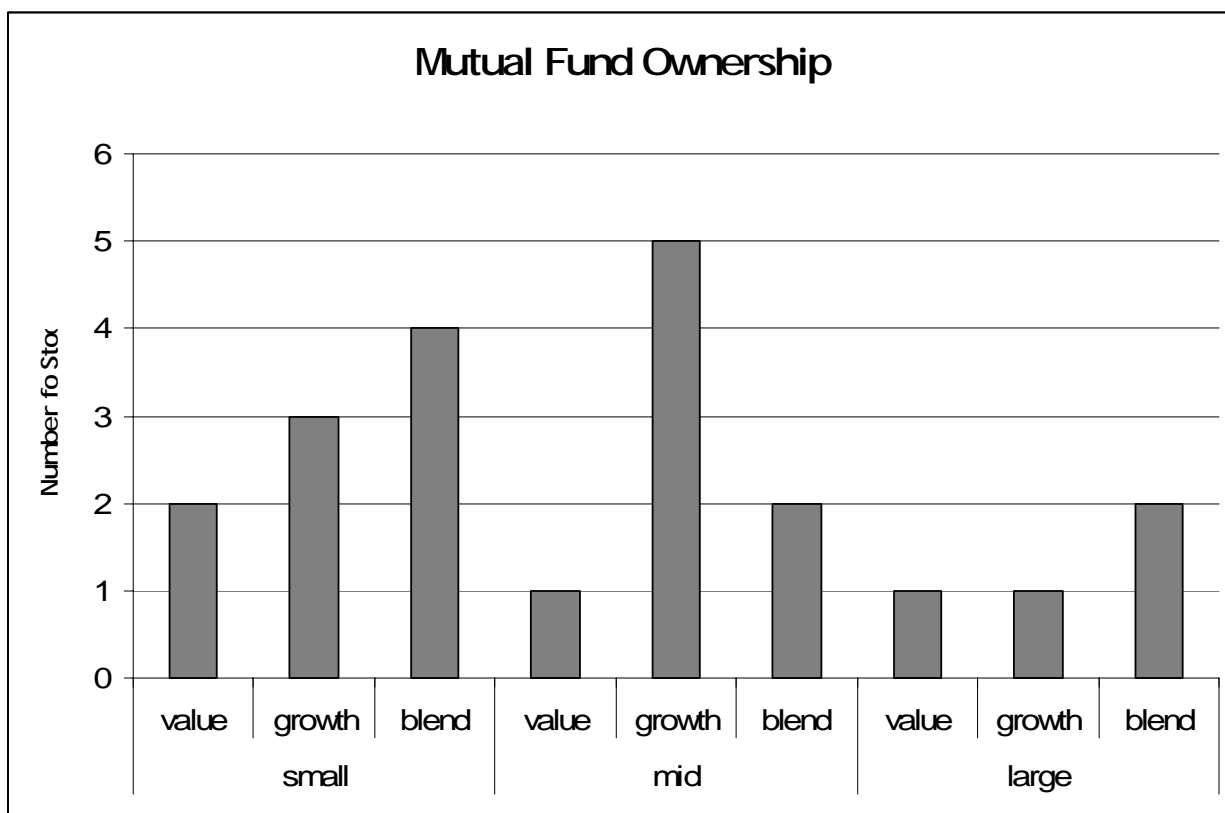


5.  
*Answer:*  
*Financial Services: 21%*  
*Media: 18%*  
*Consumer Goods: 26%*  
*Utilities: 35%*

## COMMUNICATING QUANTITATIVE INFORMATION

ANSWER:

One way to show how a mutual fund is invested is to use a histogram, as shown below.

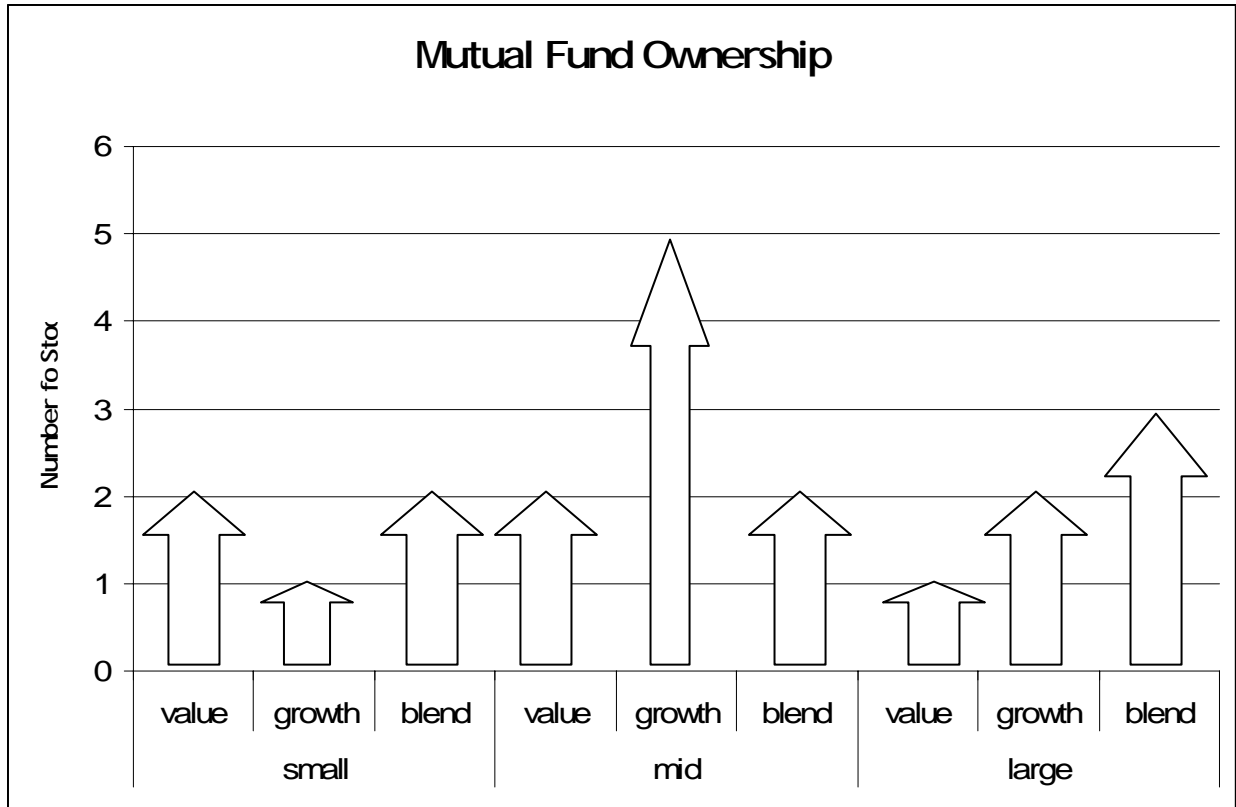


To construct a histogram, add one unit to the appropriate column for each company listed. Use the companies' profiles below.

Company	Growth Rating	Cap	Company	Growth Rating	Cap
1	Value	Small	11	Blend	Mid
2	Blend	Small	12	Blend	Large
3	Growth	Mid	13	Growth	Small
4	Value	Small	14	Growth	Large
5	Blend	Large	15	Blend	Large
6	Growth	Mid	16	Growth	Large
7	Value	Large	17	Blend	Mid
8	Value	Mid	18	Growth	Mid
9	Value	Mid	19	Growth	Mid
10	Growth	Mid	20	Blend	Small

# COMMUNICATING QUANTITATIVE INFORMATION

ANSWER:



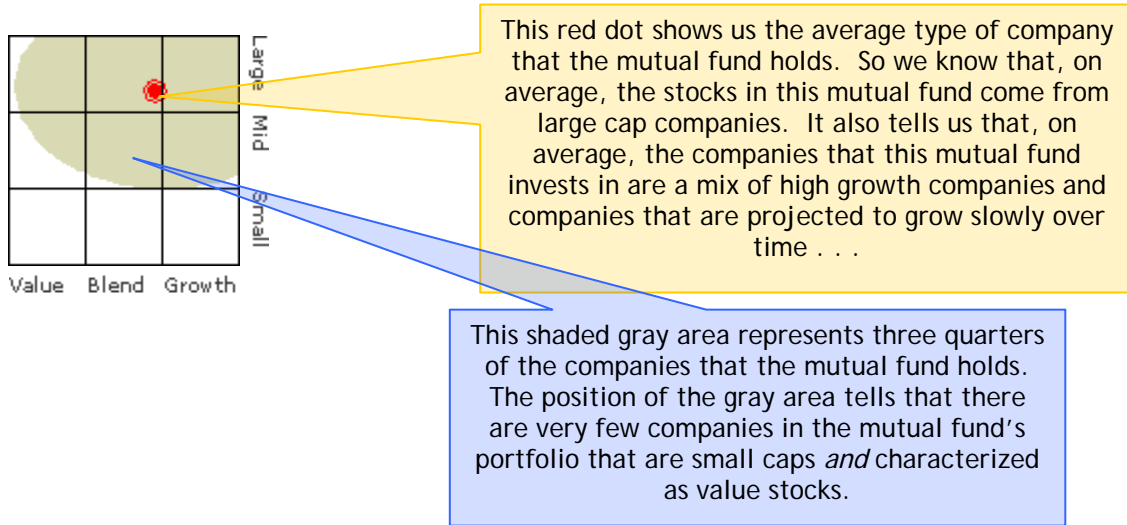
On average, what type of stocks does this mutual fund invest in?

*Answer: Mid cap growth (Mode & Median)*

## COMMUNICATING QUANTITATIVE INFORMATION

### ANSWER:

One way to show how diversified your portfolio is to use an Ownership Graph, as shown below.



To construct an ownership graph, plot one point for each company listed.<sup>1</sup>

---

<sup>1</sup> This is a simplified version of an ownership graph. Usually ownership zone graphs incorporate information on how much money is invested in each company stock, and weighted averages are used to calculate the centroid of the data.

## COMMUNICATING QUANTITATIVE INFORMATION

ANSWER:

Use the companies' profiles below to create an ownership graph.

Company	Growth Rating	Cap	Company	Growth Rating	Cap
1	Value	Small	16	Growth	Large
2	Blend	Small	17	Blend	Mid
3	Growth	Mid	18	Growth	Mid
4	Value	Small	19	Growth	Mid
5	Blend	Large	20	Blend	Small
6	Growth	Mid	21	Growth	Large
7	Value	Large	22	Blend	Large
8	Value	Mid	23	Blend	Mid
9	Value	Mid	24	Blend	Large
10	Growth	Mid	25	Blend	Mid
12	Blend	Mid	26	Growth	Large
12	Blend	Large	27	Growth	Mid
13	Growth	Small	28	Blend	Large
14	Growth	Large	29	Value	Large
15	Blend	Large			

*ANSWER:*

	Value	Blend	Growth	
	*	* * * * * *	* * * *	Large
	* *	* * * *	* * * * * *	Mid
	* *	* *	*	Small

On average, what type of stocks does this mutual fund invest in?

*Possible Answer: 21 out of 29 of the stocks are in the Large (growth & blend) & Mid (growth & blend). On average the stocks in this mutual fund would be MID BLEND.*

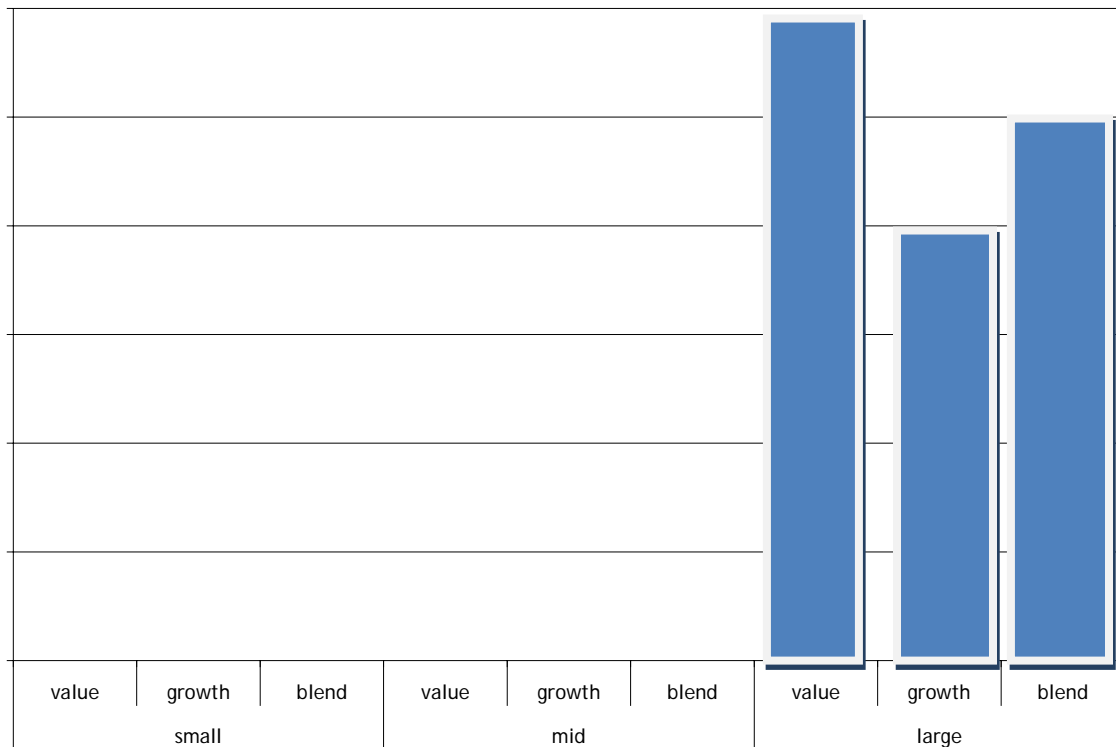
## TACKLING COMPLEX PROBLEMS

As you have been learning, different investors have different priorities, and as such, they need different investment strategies. Some investors can chase volatile stocks, while others should be invested in stable, small growth companies for the long term.

Given the profiles of the investors below, think of the type of mutual fund that would best fit each investor. State what kind of investor you think each person is, then graph what the asset allocation of that mutual fund might look like.

1. Elena hopes to protect her retirement savings and hopes to invest some of this morning in a mutual fund that would provide small gains. She knows that she will only be invested for a few more years, so she wants to avoid funds that could go up or down quickly. She prefers to invest in larger companies.

*Possible Answer: Elena is a conservative investor who is looking for small save investments that she may want to use in the next few years or so.*

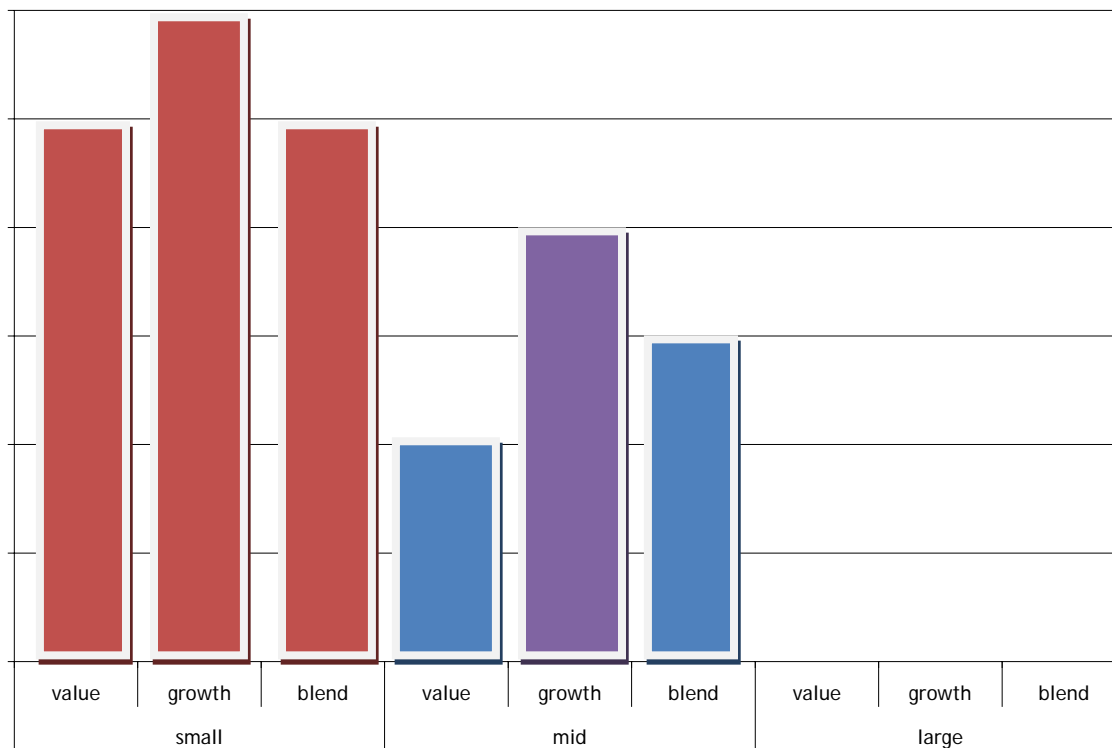




## TACKLING COMPLEX PROBLEMS

2. Juan is a shrewd investor who has extensive experience trading stocks and acting as a financial advisor to other people. He has enough money that his portfolio can with some volatility; in fact, he is looking to invest in risky stocks in hopes that they will provide big payoffs.

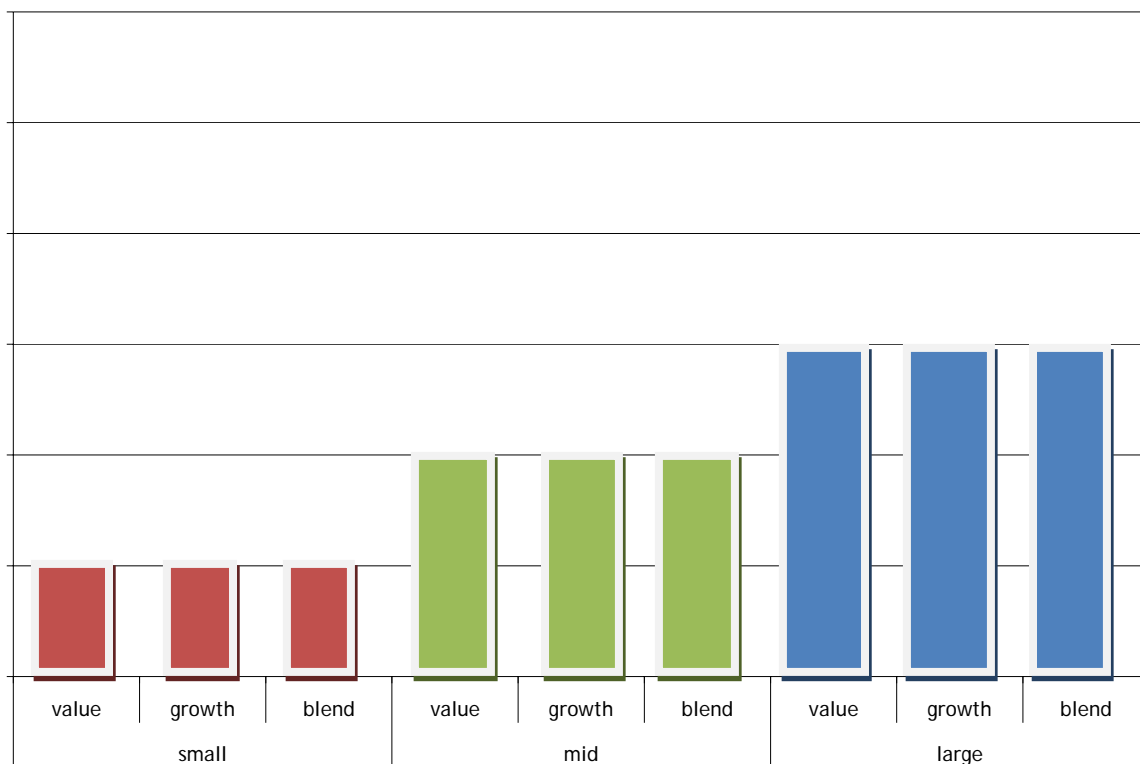
*Possible Answer: Juan is a risk taker and feels he can handle any losses that he may have to endure.*



## TACKLING COMPLEX PROBLEMS

2. Xu has been investing money for a few years. She knows some things about the stock market, but she knows she still has a lot more to learn. She can tolerate some risk in her portfolio, but not much. She is much more interested having a broad, diversified portfolio that represents many different types of companies.

*Possible Answer: Xu is a moderate investor who wants her portfolio diversified.*



## What Causes Stock Prices to Change?

### ANSWER KEY

To calculate a P/E ratio, simply divide the price per share by the earnings per share. This number tells you about how much investors will pay for \$1 of earnings from a company.

Calculate the P/E ratio for the stocks #1-8.

*Answer: share price ÷ earnings per share  
# 46.35 ÷ 1.70 = 27.26*

Stock	P/E Ratio
Stock #1 Share Price = \$46.35 Earnings Per Share = \$1.70	<i>27.26</i>
Stock #2 Share Price = \$33.11 Earnings Per Share = \$2.02	<i>16.39</i>
Stock #3 Share Price = \$69.85 Earnings Per Share = \$1.83	<i>38.17</i>
Stock #4 Share Price = \$53.22 Earnings Per Share = \$1.50	<i>35.48</i>
Stock #5 Share Price = \$31.98 Earnings Per Share = \$2.20	<i>14.54</i>
Stock #6 Share Price = \$79.10 Earnings Per Share = \$1.92	<i>4.20</i>
Stock #7 Share Price = \$65.49 Earnings Per Share = \$.80	<i>81.86</i>
Stock #8 Share Price = \$44.35 Earnings Per Share = \$1.00	<i>44.35</i>



## INTERPRETING STATISTICS

Hurricane Katrina, one of the deadliest hurricanes in American history, struck the Gulf Coast in late August 2005. This tragedy impacted the stock market because investors knew that companies would be affected differently by this event.

The graphs below show two different industries' performances over the same time period. One of the trend lines shows the performance of companies that owned lumber businesses, while the other trend line tracks the performance of residential insurance companies.



1. Using the chart above, describe the trend of the solid line.

*Possible Answer: Solid line in June increasing slightly until late August when there was a tremendous up swing, just after the hurricane. After a few weeks it went down and eventually rebounded toward the end of the year.*



## INTERPRETING STATISTICS

2. Using the chart above, describe the trend of the dotted line.

*Answers will vary: Before hurricane Katrina was already declining. However, after the hurricane it continued a downward spiral. It then began to recover at the end of September. Unfortunately, in October the industry took a nose dive again. Finally, in November the industry rebounded and headed for a more stable trend.*

3. Which trend line, the dotted line or solid line, do you think belongs to the lumber businesses? Why?

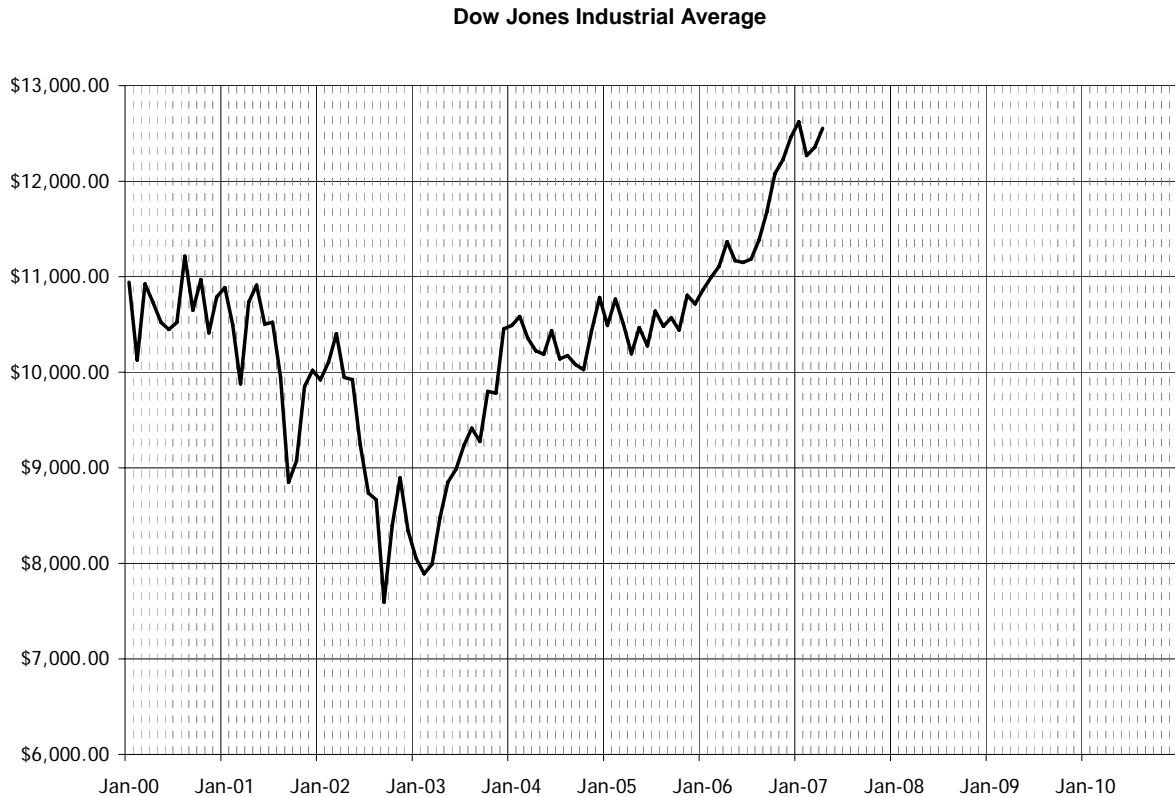
*Answers will vary: The solid line belongs to the lumber business. After, the destruction of the hurricane there would be a need for a lot of building materials, bringing a demand for lumber and other building accessories.*

4. Which belongs to the residential insurance companies? Why?

*Answers will vary: The dotted line belongs to the residential insurance industry. Once again, after such mass destruction there would be thousands of residential claims for insurance.*

## COMMUNICATING QUANTITATIVE INFORMATION

Below is a graph of the Dow Jones Industrial Average from January 2000 to April 2007.



1. When was the Dow Jones Industrial Average at its lowest point on the graph above?

*Answer: The lowest point was September, 2002.*

2. When was the Dow Jones Industrial Average at its high point on the graph above?

*The highest point was January, 2007.*

3. In what year did the Dow Jones Industrial average make the greatest gain?

*Answer: In 2003 the Dow made its greatest gain. It made roughly a 2,500 increase.*

## COMMUNICATING QUANTITATIVE INFORMATION

Use the graph to identify where each historical event occurred and what happened to the market.

1. Terrorists attacked the United States in September 2001.  
*Answer: After the terrorists attack the market decreased a little, but finished the year strong.*
2. President Bush was reelected in November 2004.  
*Answer: After President Bush was re-elected the market rose and has continued to do so since.*

## TACKLING COMPLEX PROBLEMS

Investors listen to the announcements made by the Federal Reserve (Fed) to determine whether the market will rise or fall. If the Fed thinks that the economy is doing well, the market tends to rally. If the Fed thinks that inflation (how much the cost of goods rises over time) is under control, the market also tends to rally.

For two statements below, summarize what the Federal Reserve has said, and then predict how the market might react after each announcement.

What the Fed Said	Recent indicators have suggested somewhat firmer economic growth, and some tentative signs of stabilization have appeared in the housing market. Overall, the economy seems likely to expand at a moderate pace over the coming quarters. (January 31, 2007)
Summary	<i>Answers will vary. Some key points to consider. With recent economic growth and signs of a stabilizing housing market we should be headed toward moderate economic growth in the coming quarter.</i>
How the market may react	<i>This is good news for the stock market. Economic growth means more spending, which could equal more profits for corporations.</i>



## TACKLING COMPLEX PROBLEMS

What the Fed Said	Readings on core inflation have improved modestly in recent months, and inflation pressures seem likely to moderate over time. However, the high level of resource utilization has the potential to sustain inflation pressures. (January 31, 2007)
Summary	<i>Answers will vary: There is still some uncertainty about inflation. On one hand there seems to be some improvements. On the other hand there is still some inflation worries.</i>
How the market may react	<i>Answers will vary: The market will probably react with some uncertainty about where inflation and what it might mean down the road.</i>

1. The day before the Fed made a positive announcement, a major market index had a value of \$11,857, and then day after the announcement the index had a value of \$12,010. Was the change in the value of the index?

*Answer: Day before announcement: 11,857(a)  
 The after the announcement: 12,010(b)  
 $a - b \div a \times 100 = \text{change in value of the index.}$   
 $11,857 - 12,010 \div 11,857 \times 100 = 1.30\%$*

2. The day before the Fed made an announcement a major market index had a value of \$12,422, and after the announcement the index had a value of \$11,975. How big was the change in the value of the index?

*Answer: Day before Fed announcement: 12,422(a)  
 Day after announcement: 11,975(b)  
 $\text{Change in value} = a - b \div a \times 100 \rightarrow 12,422 - 11,975 \div 12,422 \times 100 = 3.60\%$*

3. The week before the Fed made a major announcement, a major market index was at a value of \$11,386. The day after the announcement, the index had a value of \$11,210. Two months later the index had a value of \$11,420. How big was the drop in the index? How big was the gain in the index?

*Answer: day before Fed announcement: 11,386. (a)  
 The day after the announcement: 11,210. (b)  
 Two months later: 11,420. (c)  
 $\text{Drop in index} = a - b \div a \times 100. 11,386 - 11,210 \div 11,386 \times 100 = 1.55\%$   
 $\text{Gain in index} = a - c \div a \times 100. 11,386 - 11,420 \div 11,386 \times 100 = 0.30\%$*

## Buy, Sell, or Hold?

### ANSWER KEY

Use the formula below to calculate the appropriate answer for each question.

$$d = \frac{m}{s}$$

where  $d$  is the value of the dividend given out each year  
 $m$  is the total amount of money a company dedicates to dividends, and  
 $s$  is the number of outstanding shares of that company.

Calculate the value of the dividend for each company.

- Company A has dedicated \$12,000,000 to dividends to be divided among 27,888,000 shares.  
*Answer:  $12,000,000 \div 27,888,000 = 0.430$  (dividend amount)*
- Company B will spend a total of \$3.6 million to dividends for their 459,750 outstanding shares  
*Answer:  $3,600,000 \div 459,750 = 7.830$  (dividend amount)*
- Company C has decided to use \$51.2 million for dividends for the 34,659,000 shares outstanding.  
*Answer:  $51,200,000 \div 34,659,000 = 1.477$*
- Calculate the amount of money each company dedicates to dividends.
- Company D will pay \$0.461 in dividends for each of its 56,333,000 shares outstanding.  
*Answer:  $0.461 \times 56,333,000 = \$25,969,513$*
- Company E awards \$.072 dividends to each of its 12,000,8000 shares outstanding.  
*Answer:  $0.072 \times 12,000,800 = \$864,057.60$*
- Company F has 4.12 million shares outstanding, and it pays \$0.975 in dividends annually.  
*Answer:  $0.975 \times 4,120,000 = \$4,017,000$*

## THINKING ALGEBRAICALLY

8. Calculate the number of shares outstanding for each company.
9. Company G used \$13.85 million to award \$0.485 dividends for each share.  
*Answer:  $13,850,000 \div 0.485 = 28,556,701$*
10. Company H awarded dividends worth \$1.02 dividends, and it spent a total of \$41.89 million on all of its shares.  
*Answer:  $41,890,000 \div 1.02 = 41,068,627$*
11. Company I awarded \$0.10 dividends and spent \$1,000,000 in total.  
*Answer:  $1,000,000 \div 0.10 = 100,000,000$*

There are many statistics that describe company and stock performance. For each of the statistics below, write a mathematical description of what each tells you. In nonmathematical language, what information does each statistic give you?

### 1 day price change %

*Answer: The one day price change % lets investors know how much a particular price of stock has changed in a 24 hour period. For example; TASER INTL. INC. (TASR) had a price change of (a) \$16.41(closing price 7/10) and (b)\$16.16 (closing price 7/11). To find the 1 day price change subtract a-b ÷ a = price change%.*

$$16.41 - 16.16 = 0.25 \div 16.41 = 0.152346 \times 100 = 1.52\%$$

### Market Cap

*Answer: The total dollar (market) value of all of a company's outstanding shares. Market capitalization is calculated by multiplying a company's shares outstanding (25,000,000) by the current market price of one share (35.75).*

*Shares outstanding (s), price of one share (p), market cap (m)*

$$S \times p = m \rightarrow 25,000,000 \times \$35.75 = 893,375,000 \text{ (market cap).}$$

*Large cap: \$10 billion plus*

*Mid cap: \$2 billion to \$10 billion*

*Small cap: Less than \$2 billion*

### P/E

*Answer: Price to Earnings ratio (P/E): A valuation ratio of a company's current share price compared to its per-share earnings. Calculated as market value per share ÷ Earnings Per Share (EPS). For example, If a company is currently trading at 43 a share and earning over the last 12 months were \$1.95 per share, the P/E ratio for the stock would be 22.05 = \$43.00 ÷ \$1.95.*

*In general, a high P/E ratio suggests that investors are expecting higher earnings growth in the future compared to companies with a lower P/E. However, the P/E ratio does not tell the whole story by itself and should be compared with other companies in the same industry.*

### Div. Yield %

*Answer: a ratio that shows how much a company pays out in dividends each year relative to its share price. Dividend Yield(y) = Annual Dividends per Share(d) ÷ Price per Share(s). For example, d = 1.01, s = 42.95*

$$(d \div s = y) \quad 1.01 \div 42.95 = 0.235 \text{ (} \times 100 \text{)} = 2.35\%$$

### Earnings Per Share (EPS)

*Answer: The portion of a company's profit allocated to each outstanding share of common stock. EPS serves as an indicator of a company's profitability.*

*Net Income(n) – Dividends on Preferred stock(p) ÷ Average Outstanding Shares(s) = EPS.  $n - p \div s = \text{EPS}$ .*

$$25,000,000 - 1,000,000 \div 15,000,000 = 1.6$$

*The EPS is an important component of the P/E ratio.*

## INTERPRETING STATISTICS

Use the statistics in Table 1 below to answer the following questions.

TABLE 1 Company C				
1 Day Price Change %	Market Cap	P/E	Div. Yield %	Long-Term Debt to Equity
2.56	3.21B	9.00	3.07	0.69

What was the price to earnings ratio for Company C?

*Answer: P/E = 9.00*

What was the market capitalization for Company C?

*Answer: Market cap for Co. C is 3,210,000,000.*

How much did the stock price for Company C change?

*Answer: The stock price changed 2.56%.*

Use the statistics in Table 2 below to answer the following questions.

TABLE 2 Company D				
1 Day Price Change %	Market Cap	P/E	Div. Yield %	Long-Term Debt to Equity
5.61	185.2M	4.31	2.98	0.24

What was the price to earnings ratio for Company D?

*Answer: The P/E ratio for Co D is 4.31.*

What was the market capitalization for Company D?

*Answer: The market cap for Co D is 185,200,000.*

How much did the stock price for Company D change?

*Answer: The stocks one day change was 5.61%.*

## TACKLING COMPLEX PROBLEMS

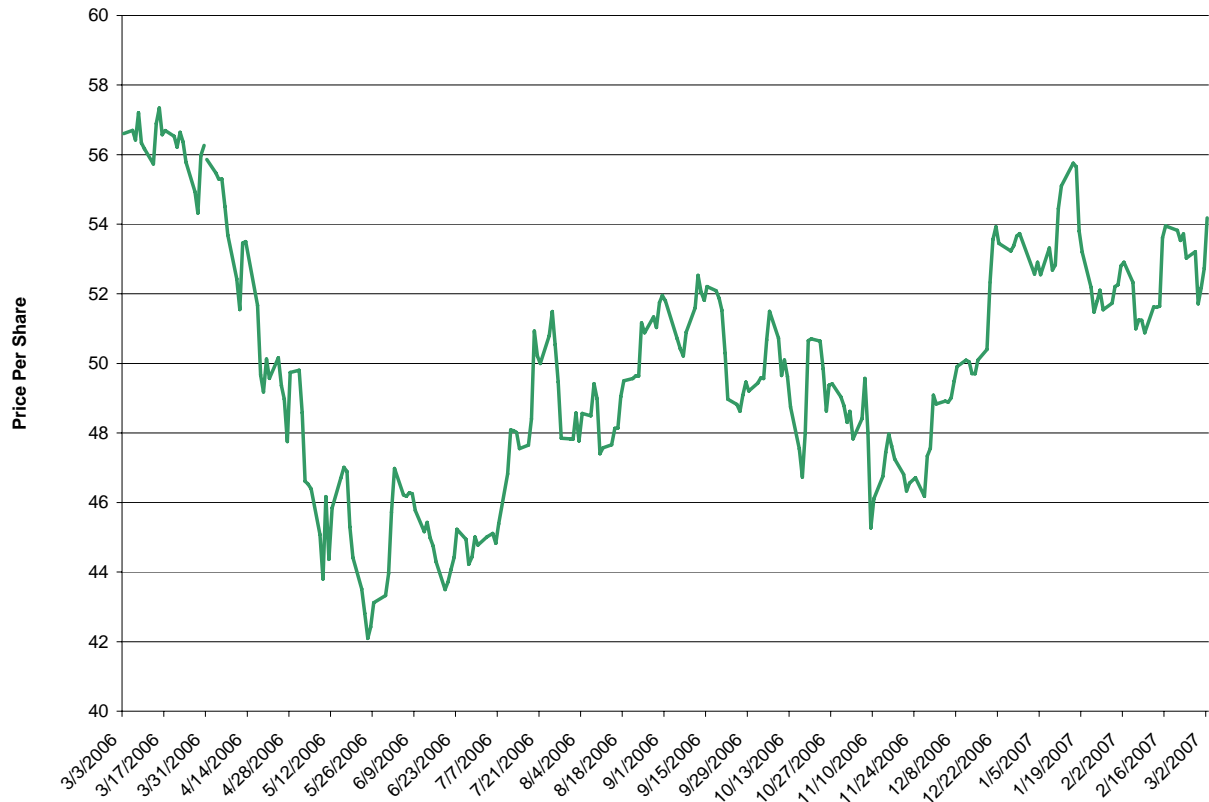
For this activity, it is suggested that teachers break students up into groups and give each group a different handout. Each student should analyze the information on their own, and then work with his or her SMG team to determine what information provided is the most important. The teacher will then lead a discussion in which groups defend their decision to buy, sell, or hold the same stock

## TACKLING COMPLEX PROBLEMS

### Convincing Others to Buy

Use the information below to create a convincing argument about why this stock should be bought. Individually, decide which three pieces of information would be the most important presenting your argument. Then, with the rest of your group, be prepared to present the most persuasive evidence to other groups in class.

### American Health Company



This company missed its fourth quarter earnings mark. Its P/E ratio is 15.91, which the P/E ratio for the industry is 14.26. Its market cap is only \$5.5 billion, while the industry's average market cap is \$230.4 billion. The company was started over 75 years ago, and has been publicly traded for the last 68 years. It pays a quarterly dividend of \$0.41.

Below are some more statistics you may find helpful.

Stock Price History	
Beta:	0.61
52-Week Change:	-4.28%
S&P500 52-Week Change:	8.52%
52-Week High (09-Mar-06):	57.86
52-Week Low (24-May-06):	41.44

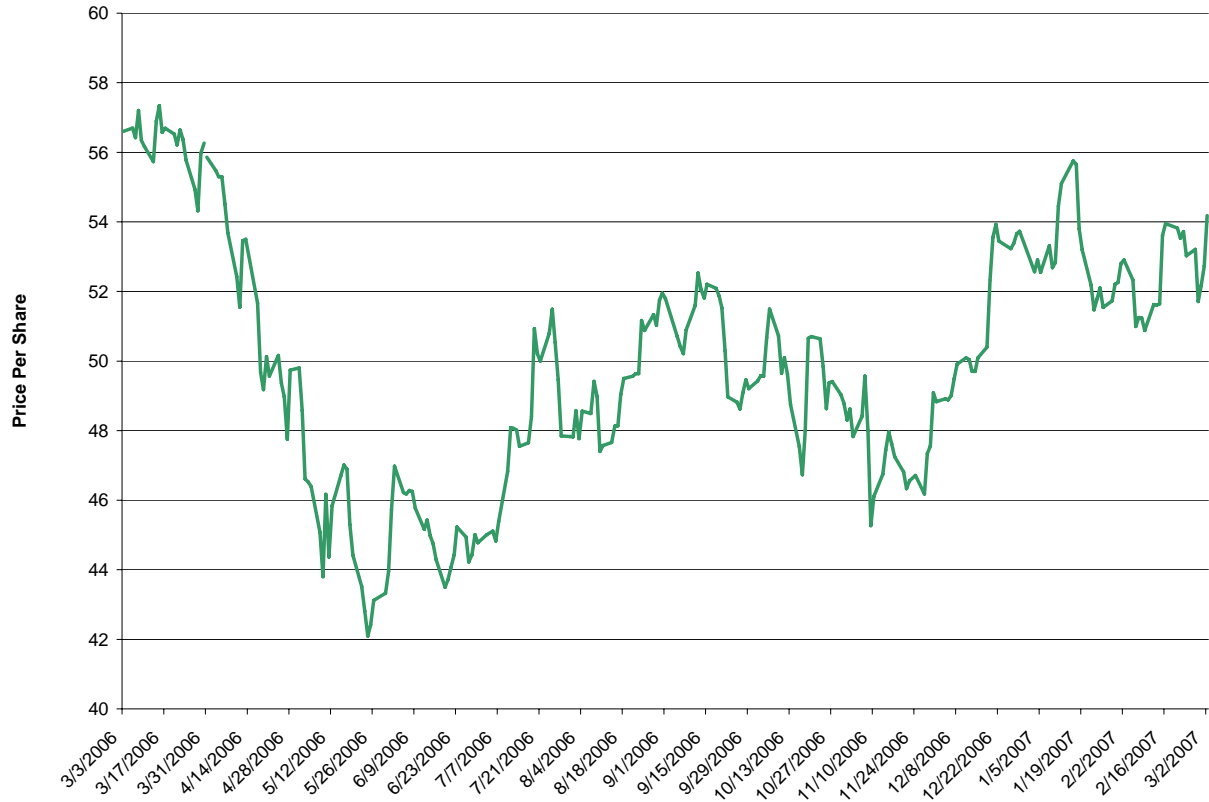
*Possible Answer: Some possible points that might be made for persuading to buy this company's stock may include, stock price is on the rise, it pays a quarterly dividend of \$0.41, This company has been around for 75 years, has a higher P/E ratio than the average for its industry (this could indicate room for growth).*

## TACKLING COMPLEX PROBLEMS

### Convincing Others to Hold

Use the information below to create a convincing argument about why this stock should be neither bought nor sold. Individually, decide which three pieces of information would be the most important presenting your argument. Then, with the rest of your group, be prepared to present the most persuasive evidence to other groups in class.

### American Health Company



This company missed its fourth quarter earnings mark. Its P/E ratio is 15.91, which the P/E ratio for the industry is 14.26. Its market cap is only \$5.5 billion, while the industry's average market cap is \$230.4 billion. The company was started over 75 years ago, and has been publicly traded for the last 68 years. It pays a quarterly dividend of \$0.41.

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52-Week Low (24-May-06):	41.44

*Answers may include, pays a \$0.41 dividend, stock price has been rising, stock price is still lower than the 52 week high, Solid company that has been around for a long time.*

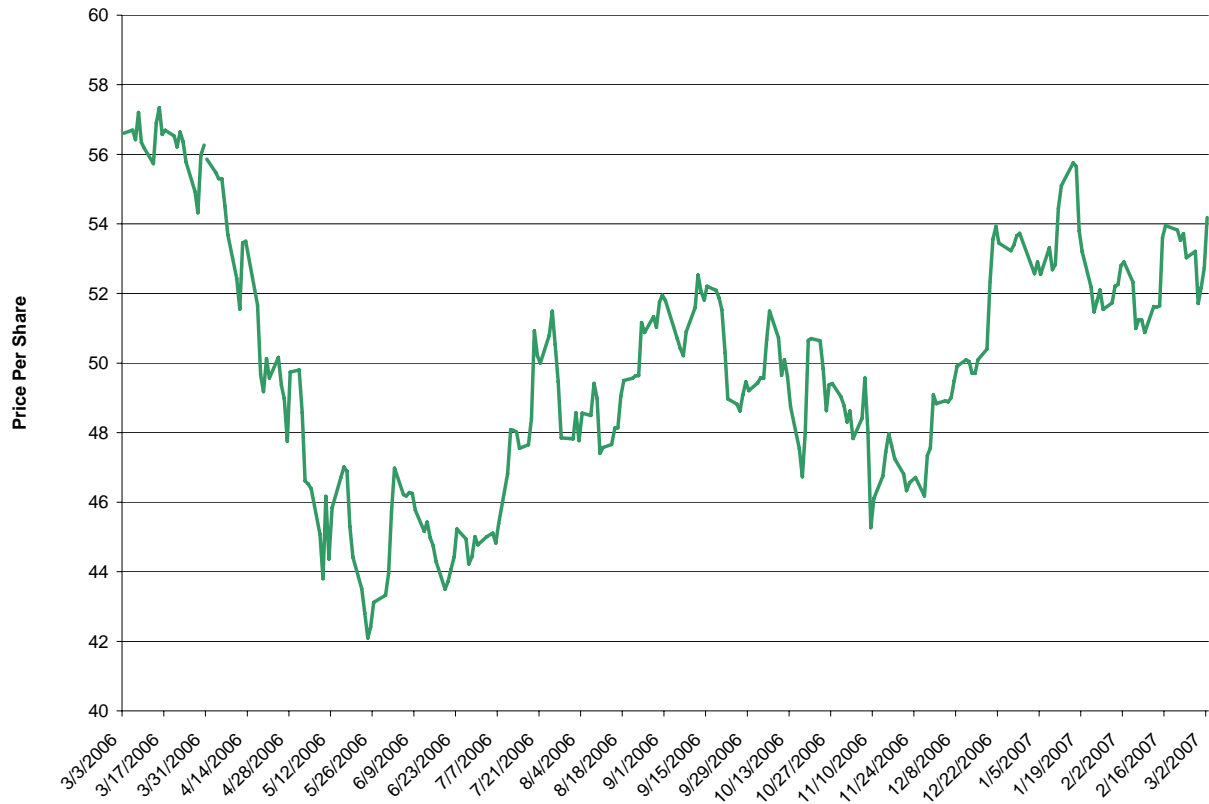


## TACKLING COMPLEX PROBLEMS

### Convincing Others to Sell

Use the information below to create a convincing argument about why this stock should be sold. Individually, decide which three pieces of information would be the most important presenting your argument. Then, with the rest of your group, be prepared to present the most persuasive evidence to other groups in class.

### American Health Company



This company missed its fourth quarter earnings mark. Its P/E ratio is 15.91, which the P/E ratio for the industry is 14.26. Its market cap is only \$5.5 billion, while the industry's average market cap is \$230.4 billion. The company was started over 75 years ago, and has been publicly traded for the last 68 years. It pays a quarterly dividend of \$0.41.

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52-Week High (09-Mar-06):	57.86
52-Week Low (24-May-06):	41.44

*Answers may include, missed 4<sup>th</sup> quarter earnings mark, (stock price could fall) stock price is close to its 52 week high, This Co has been around 75 years, yet its market cap is extremely low compared to other companies in its industry. Why did the company's stock price drop over \$14.00 in a three-month period?*

## TACKLING COMPLEX PROBLEMS

Investors are interested in how much a company will pay in dividends. When a company is deciding how much money it will pay its investors in the form of dividend, it considers its net income, allocates a certain amount of that to reinvestment in the company and uses the rest to pay investors dividends.

Use this information to answer the following problems.

1. Textiles, Incorporated allocated \$13.6 million to award an annual dividend for each of its 10,362,550 outstanding shares. How much will each dividend per share be worth?  
*Answer:  $13,600,000 \div 10,362,550 = \$1.31$*
2. Using the same information from above, how much will each quarterly dividend per share be worth if the dividends are awarded quarterly?  
*Answer:  $1.32 \div 4 = 0.33$  (quarterly dividend)*
3. If someone buys 350 shares of Textiles, Inc. and receives three quarterly dividend payments for each share, how much money will the investor receive in dividends from Textiles, Incorporated?  
*Answer:  $350 \times \$0.33 = \$115.50 \times 3 = \$346.50$   
(Shares bought  $\times$  quarterly dividend payment  $\times$  3 quarterly dividend payments to be made)*
4. Wood Products Company has planned to use one fifth of its \$267.45 million dollars of net income to pay an annual dividend. If they have 84 million shares outstanding, how much will each annual dividend per share be worth?  
*Answer:  $\$267,450,000 \div 5 = \$53,490,000$ (dividend allocation).  $\$53,490,000 \div 84,000,000 = \$0.637$ .*
5. Using the same information from above, if Wood Products Company decides to award dividends three times a year, how much will each dividend per share be worth?  
*Answer:  $0.637 \times 3 = 0.212$*
6. If someone was hoping to earn \$750 in dividend earnings over the course of a year from Wood Products Company stock, how many shares do they need to have?  
 *$\$750 \div 0.637 = 1,177.39$*

## TACKLING COMPLEX PROBLEMS

7. Unified Medical Supply, Inc. would like to pay \$0.12 per share in dividends per quarter. If they have 2.3 million shares outstanding, how much money will they pay in one quarter in dividends?

*Answer:  $2,300,000 \times 0.12 = \$276,000$*

8. If the number of shares outstanding remains the same, how much will they pay in dividends for the entire year?

*Answer:  $276,000 \times 4 = 1,104,000$ (money allocated to dividends)*

9. If they have a net income of \$9.6 million, what percentage of their net income will they have spent on dividend payments?

*Answer: money allocated to dividends  $\div$  net income = % of net income spent on dividends*

*$1,104,000 \div 9,600,000 = 0.115 \times 100 = 11.5\%$*

## How Successful Was My Investment Strategy?

### ANSWER KEY

For each of the stocks that you had in your portfolio, calculate the % gain/loss per share over the course of time you held the stock.

The formula for calculating percent change is

$$\% \text{ change} = \frac{\text{current\_price} - \text{Net / costshare\_price}}{\text{Net / costshare\_price}} \cdot 100\%$$

*Answers will vary. Below is a sample of what to do.*

$$38.53 - 35.20 \div 38.53 \times 100 = 9.38\%$$

Ticker symbol	Net cost/share	Current price	Unrealized gains losses %
<i>GE</i>	<i>\$35.20</i>	<i>\$38.53</i>	<i>9.38%</i>
<i>GLW</i>	<i>\$22.80</i>	<i>\$25.90</i>	<i>13.60%</i>
<i>AAPL</i>	<i>\$95.00</i>	<i>\$126.55</i>	<i>33.21%</i>
<i>SYK</i>	<i>\$67.50</i>	<i>\$63.50</i>	<i>-5.93%</i>

1. Which stock was the biggest gainer?

*Answers will vary, but in my example AAPL had the biggest gain at 33.21%*

2. Which was the biggest loser?

*Answers will vary, but in my example SYK was the biggest loser @ -5.93%*

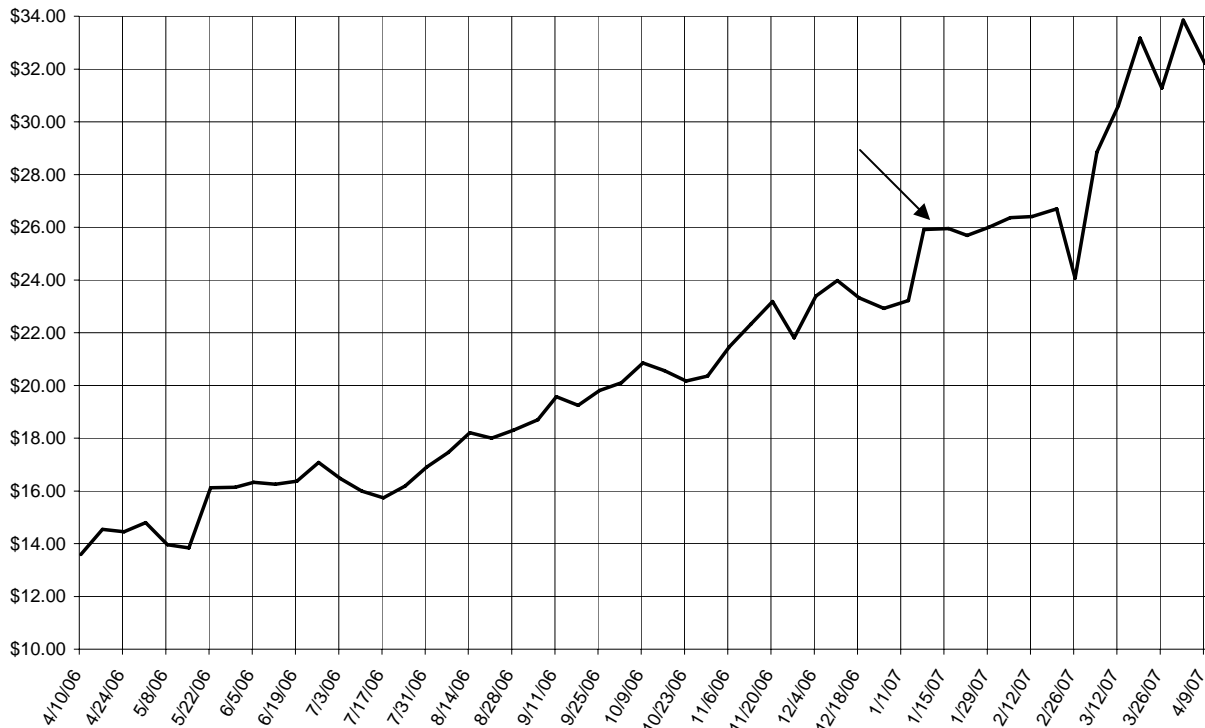
3. Was anything surprising about these results?

*Answers will vary, but in my example I was surprised to see AAPL to increase in value so much. In a given year 7% to 10% is an excellent return.*



## INTERPRETING STATISTICS

### Big Lots Inc.



A group playing The Stock Market Game™ bought 1000 shares of Big Lots, Inc. stock (BIG) during the first day of the game on January 3, 2007. During the previous year, its stock ranged in price from a low of \$12.80 to a high of \$30.00.

Show on the graph when the team started the game.

*Answer: 1/13 & about \$26.00 should be circled.*

Find and circle the stock's price on the following dates on the graph above:

January 15, 2007

*Answer: \$26.00 should be circled.*

February 12, 2007

*Answer: \$26.50 (or close to) should be circled.*

February 26, 2007

*Answer: \$24.00 (or close to) should be circled.*

March 12, 2007

*Answer: \$30.50 (or close to) should be circled.*

Using the graph above, for each date below, state what your advice to the group would have been (buy, sell, or hold, and why) given how much information you would have had at the time.

*Answers will vary. Possible answers may include:*

January 15, 2007

*Hold! Just purchased this stock 12 days ago and it is still holding at \$26.00.*

February 12, 2007

*Hold! Stock is starting to increase in value. At this point I suggest the team decides on a high & low stock price. In other words how far do we want to let it go up before we sell for profit or if it goes down how far do we let it decrease before we sell and cut our losses.*

February 26, 2007

*Hold! This stock has been increasing steadily over the past 10 months or so. There have been other little dips during that time.*

March 12, 2007

*Sell! We bought Big Lots for \$26.00. It's now at or about \$30.00. We have made  $4.00 \div 26.00 \times 100 = 15\%$  return if we sell now. Besides we have hit a new 52 week high.*

Many financial advisors encourage investors to invest for the long-term instead of buying and selling over short periods of time. Based on the graph, why do you think they give this advice?

*Answers may vary: In a one year span the stock price for Big Lots went up 131% an increase of about \$18.00 per/share. During that time there was about 11 times that the stock price decreased a little. Over the long-term it is possible to make more from your investment. If one were to sell there Big Lots when it dropped to \$24.00 they would have made a loss. When a stock price drops in value it is important to research and find out why it did so.*

## COMMUNICATING QUANTITATIVE INFORMATION

Below are the values of a team's SMG portfolio over a ten week period.

Week	Value
0	\$100,000
1	\$101,439
2	\$103,220
3	\$103,422
4	\$101,984
5	\$106,339
6	\$108,220
7	\$110,219
8	\$112,032
9	\$110,420
10	\$100,986

At the end of the ten weeks, the team was ranked:  
last in their class  
ninth out of ten in their grade  
and twenty-eighth (out of 31) in their school.

Over the same ten-week period, the Dow Jones Industrial Average increased 0.69%, the S&P 500 increased 0.44%, and the NASDAQ composite decreased by 1.06%.

Several members of the team feel badly about their performance because their investment lost a lot of money in the last week of the game, and they feel that their rankings were very low.

Describe the trend in the value of the investment over the ten week period.

*Answers will vary: Steady increase from weeks 1-3. They took a loss in week 4 but followed that with 4 straight weeks of solid gains. If it were not for a sudden drop in the last week they would have had a nice 10% rate of return.*

Calculate the overall percentage change in the value of their portfolio from week 1 to week 10.

*Answer: 0.99%*

Write the team a brief letter telling them your honest assessment of their performance. You may want to compare the percentage gain in the portfolio to the rate of return of the indices, and you may also include your own experience with The Stock Market Game

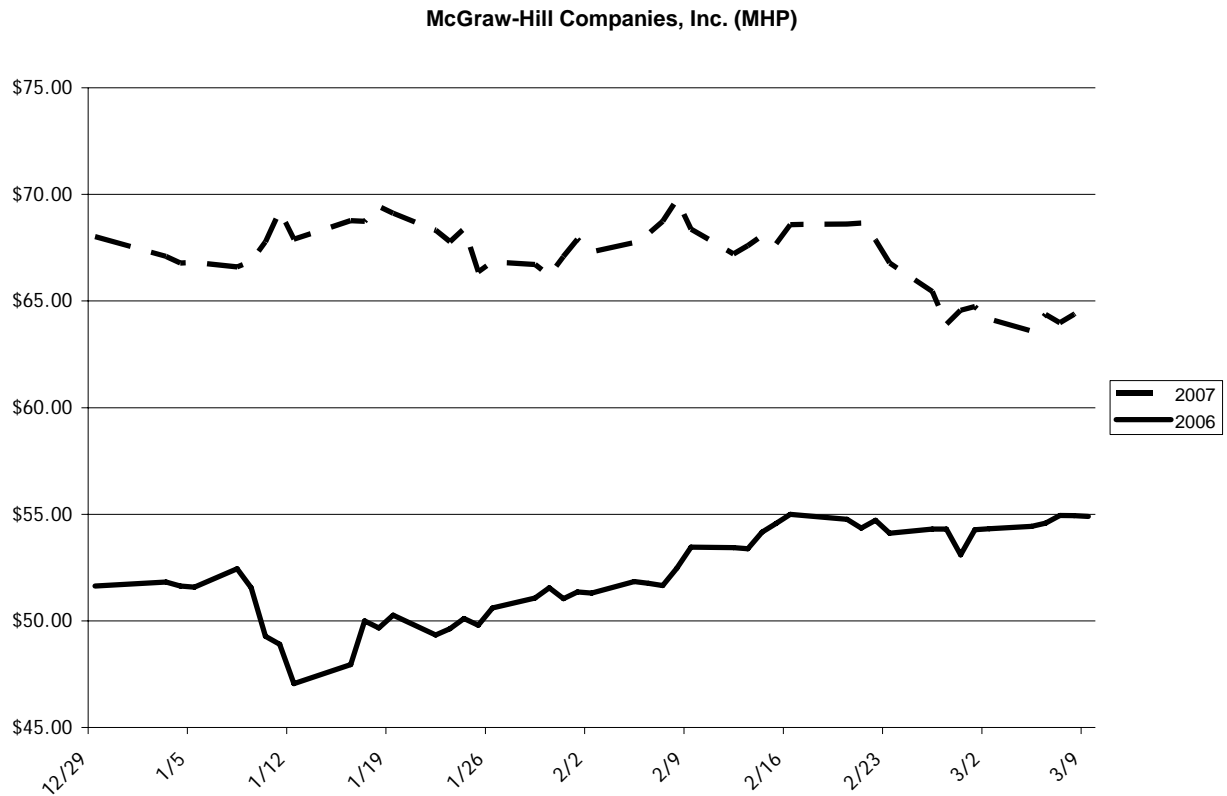
*Answers will vary. Possible points to be made:*

*Overall did better than the NASDAQ, DOW & the S&P 500. The portfolio may have rebounded after the 10-week simulation. Continued research on stocks in the portfolio may have caught some bad news about some of your companies. The portfolio did well for 8 weeks, maybe on week 9 might have sold some of your holdings.*

## TACKLING COMPLEX PROBLEMS

Choose two stocks from your portfolio and graph each of their share prices over the ten weeks.

Use an online financial information to look up the historical prices of those same stocks during the ten-week period last year. Graph the previous history on the same plot for each company. (An example is shown below.)



Given the information, did each stock out perform or underperform their history?

*Answers will vary.*