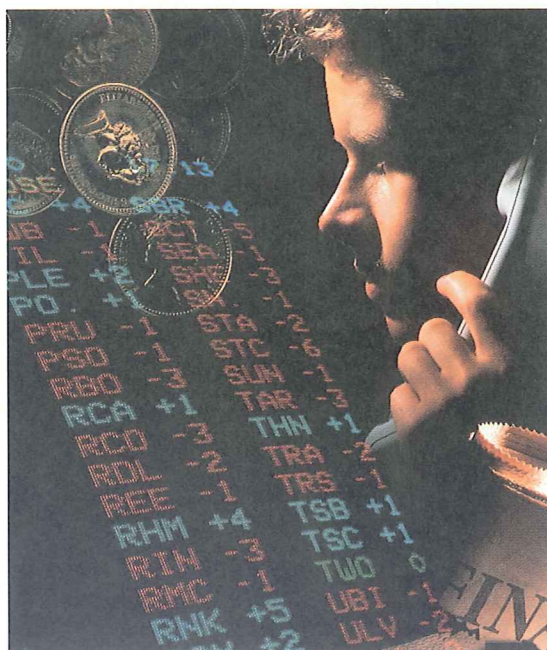


## 8-3 INVESTMENT PROS AND CONS



**D**uring the many months that Maria was saving up for her car, Nelson kept track of her savings account and noticed how steadily it was growing. After hearing his explanation of the effects of compound interest, she became as intrigued as he was by the idea that compound interest can make invested money appear to take on a life of its own and seemingly grow without any outside help.

Nelson knows that Maria is learning about the stock market and mutual funds and that she is thinking about the risks involved in

investing real money in one of these areas. They have spent many hours discussing the problem Clarence Sr. has been having since the value of his investments took such a beating on Black Monday.

Having watched what happened to Cal and his family, Nelson and Maria understand that a wise investor must not view investments as a gamble and must not jump into any investment scheme that promises large, fast profits. If such an “opportunity” seems too good to be true, it probably is!

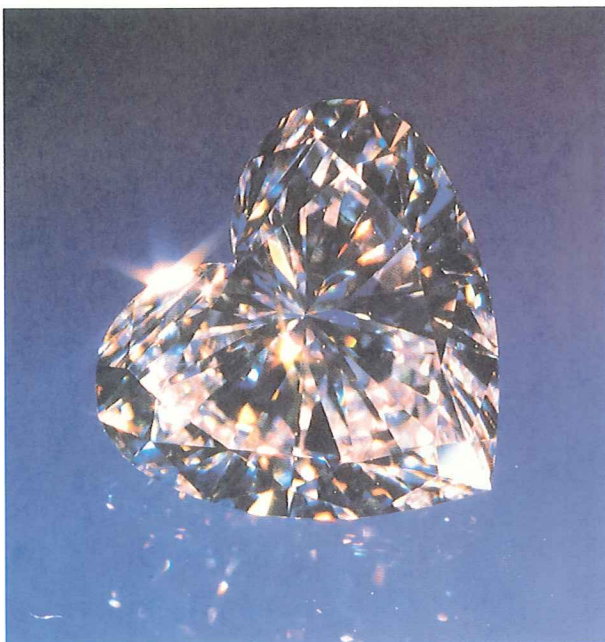
**OBJECTIVES:** *In this lesson, we will help Nelson and Maria to:*

- *Examine ways to avoid risky investment schemes.*
- *Graph the change in the market value of an investment over a long period of time.*
- *Use a line of best fit to predict the approximate future value of an investment.*



## INVESTMENT BOOBY TRAPS

Nelson has seen ads such as these in the newspaper:



“Worried about inflation? Diamonds are an investor’s best friend.”

“Make quick money! For only \$1000, you can earn \$16,000.”

“Let me show you how I can quadruple the value of your stock portfolio in 18 months!”

Investment come-ons such as these operate on the principle that greed will overcome common sense. They often separate the investor from his or her money without anything of value being provided in return. However, in the past the situation was far worse. For example, unlike today, stock prices were frequently manipulated by those in a position to distribute misleading information about stocks.

After the stock market crash of 1929 the U.S. Congress established the **Securities and Exchange Commission (SEC)**, an independent federal agency whose purpose is to prevent the return of the unsound stock selling practices and schemes that were common

before the crash. The commission has two basic responsibilities.

- To require companies that offer securities for sale in more than one state to file with the commission and to make complete and accurate information about the company available to investors
- To protect investors against misrepresentation and fraud in the issuance and sale of securities

The SEC requires companies, including mutual fund companies, to disclose facts that are essential for an investor to make an informed investment decision. However, this agency cannot protect the public from making poor investment decisions. To become an investor who is not taken advantage of, you should take to heart the following tips from the SEC.

- Do not deal with security firms or salespeople with whom you are not personally familiar. Consult people whose knowledge about such matters you trust; perhaps your local banker can play this role.
- Be sure you understand the risk that you are assuming when you buy stock or mutual fund shares. Risk cannot be eliminated, but it can be managed; be sure that the level of risk is not too great for the gain you expect to achieve.
- Tell any salesperson who is promising a specific investment result to put the recommendations and expectations in writing.
- Give at least as much consideration to your investments as you would to any other valuable asset or property.
- Do not play the market, that is, do not buy a stock with the intention of selling with a profit in only a few weeks or months.



- Do not listen to high-pressure sales talk.
- Beware of tips, rumors, and promises of spectacular profits. A deal that sounds too good to be true probably *is* too good to be true.

### DOES THE BROKER HAVE A DEAL FOR YOU!

While the great majority of brokers are very honest, you may occasionally run into a con artist who is interested only in taking your money. Be very wary of a salesperson who does not have a reputation that you can check on or who does any one of the following.

- Plugs one certain stock or mutual fund and refuses to sell you anything else
- Promises a quick, sure profit
- Claims to have inside information
- Urges you to hurry “before the price goes up”

If you wind up falling for a slick operator’s con game at some time during your life, take comfort from the fact that almost everyone gets stung in that way at least once. Finally, when you do decide to invest, never risk more than you could feel comfortable losing. Otherwise, you may lose money even from a well-chosen investment. This might very well happen if a temporary (but severe) drop in its price were to frighten you into selling a basically sound investment at a loss.

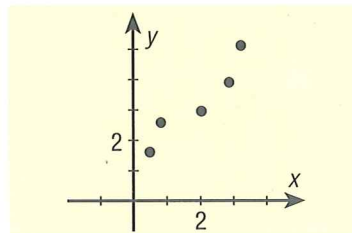
### Ask Yourself

1. What is the Securities and Exchange Commission?
2. What are the basic responsibilities of the U.S. Securities and Exchange Commission?

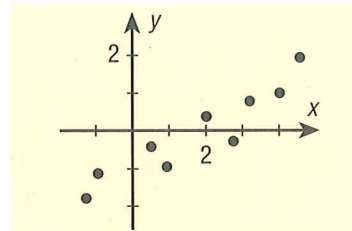
## ALGEBRA REVIEW

Select the equation that *best fits* the points in each of the following graphs. Explain why the equation fits best and the others do not fit. Remember that none of the equations will fit perfectly.

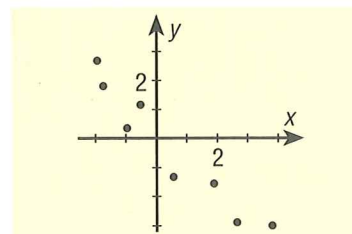
1. a.  $y = x + 1$   
b.  $y = 2x$   
c.  $y = x + 2$

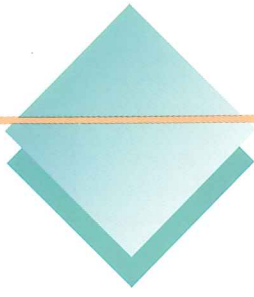


2. a.  $y = x$   
b.  $y = 0.5x - 1$   
c.  $y = x - 1$



3. a.  $y = -x$   
b.  $y = x$   
c.  $y = -x + 1$

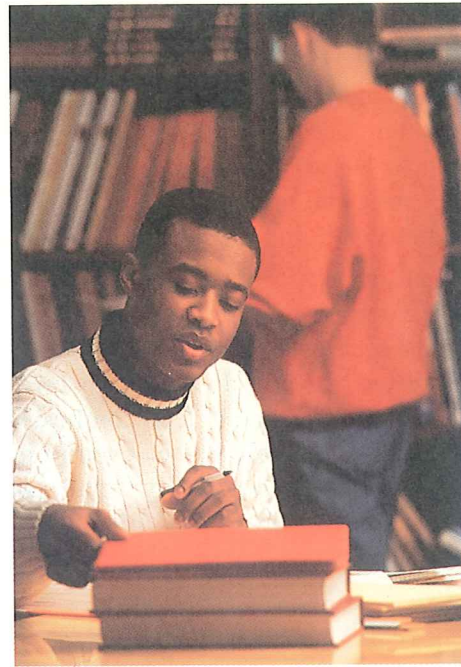




## SHARPEN YOUR SKILLS

### SKILL 1

**EXAMPLE 1** Nelson has consulted a mutual funds reference manual at his neighborhood library. From the manual he recorded the 5-year price performance of the Vantage Balanced Mutual Fund, a fund recommended by Maria's investor friend. The prices were taken at 6-month intervals from July 1, 1988, to July 1, 1993, as shown.



Date	Years After Start	Price of Vantage Balanced Mutual Fund
July 1, 1988	0.0	\$10.00
Jan. 1, 1989	0.5	10.60
July 1, 1989	1.0	11.80
Jan. 1, 1990	1.5	11.60
July 1, 1990	2.0	12.20
Jan. 1, 1991	2.5	12.40
July 1, 1991	3.0	13.60
Jan. 1, 1992	3.5	14.80
July 1, 1992	4.0	15.50
Jan. 1, 1993	4.5	16.20
July 1, 1993	5.0	16.80



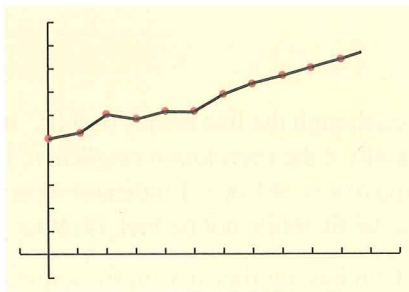
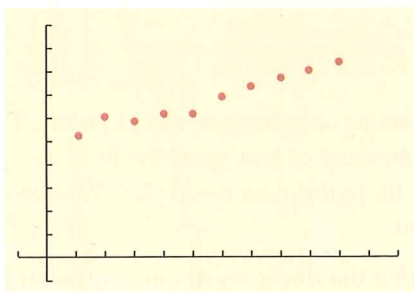
**QUESTION** How can Nelson graph this price information?

**SOLUTION**

Nelson enters the data into his graphing calculator with the years after the start as  $x$  values and the prices as  $y$  values (11 ordered pairs of numbers starting with  $x_1 = 0, y_1 = 10.0$ ). He chooses a range.

Xmin:  $-0.5$       Ymin:  $-2$   
Xmax:  $6$         Ymax:  $20$   
Xscl:  $0.5$        Yscl:  $2$

He plots all of the price/date information first as a **scatter plot** (left below), then as a **broken line graph** (right below). The broken line graph shows how the prices of the Vantage Balanced Mutual Fund changed over 5 years.



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**SKILL 2**

**EXAMPLE 2** Nelson wants to find an equation that will fit the points he has graphed.

**QUESTION** How can Nelson use a linear regression equation to find a line of best fit?

**SOLUTION**

Nelson decides to use his graphing calculator to find the *line of best fit* for the scatter plot. A linear equation of the form

$$y = a + bx$$

is called the **linear regression equation**. To obtain  $a$  and  $b$ , Nelson chooses “linear regression equation” from a menu on the graphing calculator. (Some graphing calculators use a code word for “linear regression equation,” for example “LinReg.”) As soon as Nelson chooses “linear regression equation,” the calculator displays the following:

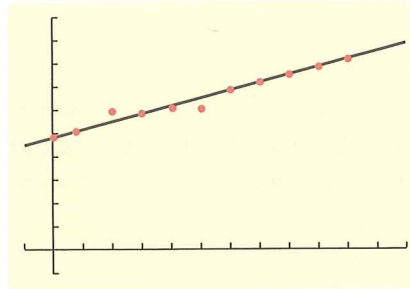
$$a = 9.804545455$$
$$b = 1.369090909$$
$$r = 0.9850588294$$



Using the values for  $a$  and  $b$  rounded to the nearest hundredth, Nelson writes an equation for the line of best fit

$$y = 9.80 + 1.37x$$

Nelson can graph the linear regression equation on the same set of axes as the original scatter plot as shown below.



Even though the line is the “best fit,” it contains only some of the 11 points. The quantity  $r$ , the *correlation coefficient*, is a measure of how good the fit is. A value of  $r = +1$  or  $-1$  indicates a perfect fit. In this case  $r = 0.985059$  shows that the fit, while not perfect, is rather good.

Nelson has another reason for knowing that the linear regression equation is not perfect, since if  $x = 0$  then

$$\begin{aligned}y &= 9.80 + 1.37(0) \\y &= 9.80\end{aligned}$$

Nelson already knows that when  $x = “0$  years after the start,” the actual price of the mutual fund is \$10.00, not \$9.80. He concludes that if he uses the equation to predict future prices of the mutual fund, then he cannot expect the predictions to be completely accurate.

**EXAMPLE 3** Nelson wants to predict future prices of the Vantage Balanced Mutual Fund.

**QUESTION** What price does Nelson’s linear regression equation predict for the mutual fund in July 1994?

**SOLUTION**

Use Nelson’s linear regression equation. July 1, 1994, is 6.0 years after the start.

$$\begin{aligned}y &= 1.37x + 9.80 \\y &= 1.37(6.0) + 9.80 && \text{Substitute 6.0 for } x. \\y &= 18.02\end{aligned}$$

The predicted price for July 1994 is a bit more than \$18. As a check, Nelson uses the trace function on his graphing calculator and notices that the point that corresponds to the ordered pair  $(6, 18)$  is almost on his line of best fit, so the algebraic solution and the graphical solution agree closely.



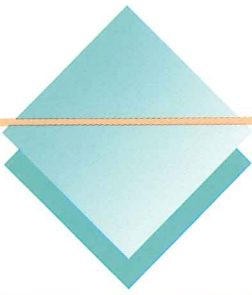
Nelson is happy with the results that he has obtained using the linear regression model. He believes that the model, while not perfect, is good enough to help him understand how the mutual fund may perform in the future. The model will provide a basis for advising Maria on whether she should invest in the fund.

## TRY YOUR SKILLS

Nelson's friend Maria is interested in taking a bit more risk than Nelson to have a greater chance of creating a higher value for her investment. So instead of looking at the Vantage Balanced Fund, she decides to study the 5-year performance of the Vantage Maximum Capital Gain Fund, shown below.

Date	Years After Start	Price of Vantage Maximum Capital Gain Fund
July 1, 1988	0	\$10.00
Jan. 1, 1989	0.5	10.40
July 1, 1989	1.0	12.40
Jan. 1, 1990	1.5	11.50
July 1, 1990	2.0	12.60
Jan. 1, 1991	2.5	11.50
July 1, 1991	3.0	13.70
Jan. 1, 1992	3.5	16.20
July 1, 1992	4.0	15.30
Jan. 1, 1993	4.5	17.50
July 1, 1993	5.0	18.00

1. Make a scatter plot for the above data beginning with July 1, 1988.
2. Make a broken line graph for the data.
3. To find a line of best fit using a graphing calculator, what should be your values for  $x_1$  and  $y_1$ ?
4. For the graph of the line of best fit, what would be a good range?
5. Which of the following equations could represent a linear equation for the line of best fit?
  - a.  $y = bx^2 + a$
  - b.  $y = ax^b$
  - c.  $y = a + bx$
  - d.  $y = ab^x$
6. Use a graphing calculator to find the linear regression equation that is the line of best fit for the data. How good is the fit?
7. Use the equation that you found in Exercise 6 to predict a possible value for the Vantage Maximum Capital Gain Fund in July 1995.



## EXERCISE YOUR SKILLS

### KEY TERMS

broken line graph  
linear regression  
equation  
scatter plot  
Securities and  
Exchange  
Commission  
(SEC)

1. Why was the Securities and Exchange Commission established?
2. Why do some people lose money on investments despite the protection provided by the Securities and Exchange Commission?
3. What signals should alert you to suspect that a broker might not be acting in your best interest?

Maria's sister, Sarita, is interested in taking a bit more risk than she would have to assume in a balanced mutual fund but not as much as in a fund that tries to attain a maximum of capital gains. She decides to study the 5-year performance of the Vantage Growth and Current Income Fund, shown below.

Date	Years After Start	Price of Vantage Growth and Current Income Fund
July 1, 1988	0	\$20.00
Jan. 1, 1989	0.5	21.60
July 1, 1989	1.0	24.80
Jan. 1, 1990	1.5	23.80
July 1, 1990	2.0	25.60
Jan. 1, 1991	2.5	25.20
July 1, 1991	3.0	28.40
Jan. 1, 1992	3.5	31.20
July 1, 1992	4.0	32.10
Jan. 1, 1993	4.5	34.00
July 1, 1993	5.0	35.00

4. Make a scatter plot for the above data beginning with July 1, 1988.
5. Make a broken line graph for the data.
6. Which of the following equations could represent a linear regression equation for the line of best fit?  
a.  $y = x^b + a$    b.  $y - bx = a$    c.  $y = b^x + a$    d.  $axy = b$
7. Use a graphing calculator to find the linear regression equation that is the line of best fit for the data. For your first data points, use  $x_1 = 0$  and  $y_1 = 20.00$ . How good is the fit?

Use the equation that you found in Exercise 7 to predict a possible value for the Vantage Growth and Current Income Fund on the following dates.

8. January 1, 1995
9. January 1, 1998
10. January 1, 1999
11. July 1, 1999
12. How well does the equation of Exercise 7 predict the actual value of the Vantage Growth and Income Fund on July 1, 1988?



For the 5-year performance of Vantage Growth and Current Income Fund, find an equation for the line of best fit for the first ten data points, omitting the data for July 1, 1993.

13. What price does the equation predict for the value of the fund on July 1, 1993?
14. How does the predicted price compare with the actual price?
15. What do you conclude from this result?

### MIXED REVIEW

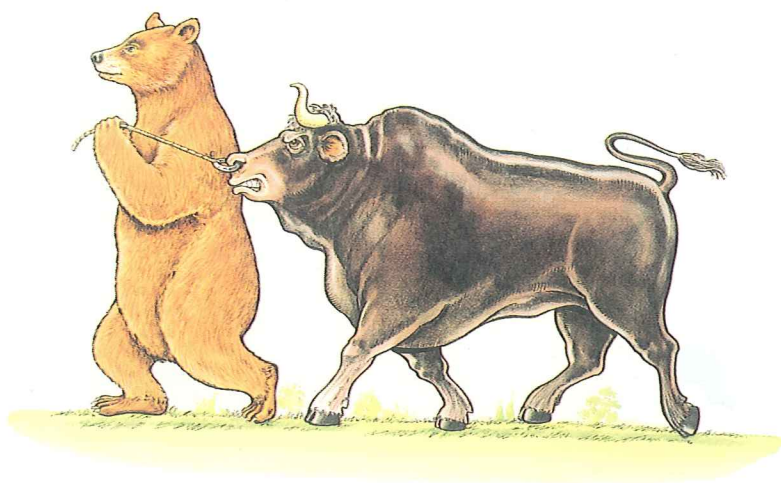
1. Find the total cost of 100 shares of Daring Ventures, Inc. at  $63\frac{1}{2}$ . The commission cost is 1.5%.

Determine the total savings on a loan of \$49,800 at 8.5% for 25 years if you make a down payment of 20% or 30% instead of 10%.

	Percent Down	Down Payment, D	Loan Amount, A	Monthly Payment, M	Total Payments, T	Savings Over 10% Down
2.	10%	\$4,980	\$44,820		\$108,270	
3.	20%					
4.	30%					

5. Why do some large lending institutions use a credit scoring system such as the one that appears on page 293 of Lesson 6–6?
6. Use the formula for the Future Value of a Periodic Investment on page 344 of Lesson 7–3 to find the amount that will be in an IRA account after 25 years if the account consistently pays a compounded rate of 7.5% per year and \$1,500 is contributed to the IRA every year.
7. Suppose that your name is Charles Lewis and your uncle sends you a check made out to “Chuck Lewis.” Show how you would endorse that check.
8. A certain insurance company expects 99.830% of all 34-year-old people to live at least one more year. What is the break-even premium for a \$50,000 policy issued to such a person by the company if the direct and indirect expenses for issuing the policy amount to \$15?
9. If you earn \$65,000 per year, how much do you pay in Social Security and Medicare taxes?
10. If you earn \$159,000 per year, how much do you pay in Social Security and Medicare taxes?
11. Suppose that your family’s take-home pay is \$3500 per month. How much can you afford to spend for credit card payments each month?





**M**aria read an article in the newspaper that referred to some investors who feared that a “bear market” might be developing. She was not sure what bears had to do with stock prices. Nelson told her that in a **bear market**, most stocks go down and that in a **bull market**, most stocks go up. He also told her that not all the stocks go up or down at the same time.

Maria also remembers from her study of the Federal Reserve System that the U.S. economy is affected by inflation. She also knows that though the rates of inflation have

varied from year to year, inflation has affected salaries and prices for a number of years. One means of measuring the effects of this inflation is the *Consumer Price Index*.

Maria has often heard her parents speak of nickel postage stamps and 10-cent newspapers as though their childhood was not that long ago. To Maria, 35 years might as well be 100, but she does know that most adults talk that way. She decides that when she is an adult, she will remember what she thought when she was a teenager and not tell her children about how low prices were when she was a kid.

**OBJECTIVES:** *In this lesson, we will help Maria to:*

- *Understand the effects of inflation as charted by the Consumer Price Index.*
- *Use the Consumer Price Index to calculate changes in prices of products.*
- *Use a regression model to illustrate changes in the Consumer Price Index.*
- *Use the concept of probability to estimate whether to invest money in a mutual fund or stocks.*