

Isabel drives 15,000 miles a year and has the following real and estimated car costs:

- Maintenance: \$150 per year
- Repairs: \$300 per year
- Loan payments: \$401.30 per month
- Insurance: \$603.27 twice per year
- Taxes: \$114 per year
- Gasoline: \$0.06 per mile

Find each of the following for Isabel.

10. Her annual expense for gasoline
11. Her monthly expense for insurance
12. The total of her annual car expenses
13. Her average cost per mile to own and operate her car
14. Her annual cost to operate the car not including the monthly loan payment
15. Create a pie graph to show her annual expenses for her car.

Mark works for a company that will make a decision about whether to pay him 20 cents per mile to drive his car for the business or to lease a car for \$200 per month and 6 cents per mile.

16. Write equations for the total monthly cost under each arrangement.
17. Solve the equations simultaneously to find the number of miles per month for which the costs will be equal.
18. Graph the two equations to show the relationship.
19. Which is the better arrangement for 1000 miles per month?
20. What is the difference in costs for a 1000-mile month?
21. Which is the better arrangement for 2000 miles per month?
22. What is the difference in costs for a 2000-mile month?

MIXED REVIEW

1. Jacob borrowed \$10,000 and repaid it at the rate of \$200 per month for 5 years. Find the total interest paid over the 5 years.

Phyllis bought 1200 shares of stock at $37\frac{3}{8}$ per share. In Exercises 2–4, ignore the commission costs.

2. Find the cost of the shares.
3. After 2 years, Phyllis sold the shares at $45\frac{5}{8}$ per share. What was the total sale price?
4. What was the capital gain or loss on the shares?
5. Use IRS Form 1040EZ to find the amount of the refund or payment due to the nearest dollar for a single taxpayer who had \$1,600 withheld on his \$13,900 income. The taxpayer has no taxable interest and cannot be claimed as a dependent by someone else.



Trevor, who is 17, is allowed to drive the family car. Sometimes, he drives his 11-year-old sister Tracey and her friends to a weekend event. Last Saturday, Trevor drove Tracey and her friends, Roy and Leah, to a movie. As he drove, another car came speeding past, rapidly changing lanes and weaving back and forth among the other cars. Just as the car passed, Trevor was distracted for an instant by the younger children in the back seat, who were wrestling over a piece of candy.

As Trevor looked up, the car that was speeding collided with another car. Both cars seemed to be heavily damaged as they skidded off the road. Trevor had to change lanes quickly and slow down to avoid another car that had moved into his lane because of the

accident. His sister and her friends had their seat belts on, but they were shaken up.

As a result of seeing the accident, Trevor asked his parents to tell him about insurance. He wanted to know what it is, why it is needed, and why costs are higher for young people. His parents explained that by collecting money from thousands of car owners, the insurance company can pay for car repairs and medical bills after accidents.

Compared with the many thousands of people who purchase insurance, only a few actually have accidents. But no one knows which ones will have the accidents, so everyone should purchase insurance. Furthermore, in most states, the law requires that you have auto insurance.

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

- *Examine several types of insurance that are available for car owners.*
- *Compare rates of auto insurance for different drivers on the basis of the age, sex, training, and marital status of the driver and several other factors.*
- *Understand how insurance companies use accident statistics to estimate their costs.*

AUTOMOBILE INSURANCE

Most states now require that car owners purchase insurance. The reason for this is that any driver might have an accident. Depending on the circumstances, the driver might then be responsible for the financial consequences of the accident. The legal term for this responsibility is **liability**. Even if not legally liable, a driver would still want to have his or her car repaired or replaced. There are a number of different kinds of automobile insurance dealing with liability.

Bodily Injury Liability This coverage is protection against claims or lawsuits that are brought against you by pedestrians, riders in your car, and people in other cars whose injuries were caused by an accident for which you are responsible. The amount of protection can vary from \$10,000 to \$1,000,000 or more. Some people choose high amounts because in serious accidents the medical bills can be enormous.

Property Damage Liability Coverage for property damage liability is paid for the damage done to other people's property, such as a car, a building, or a fence. Property damage insurance might range from \$5,000 to \$50,000. It also protects you when you are driving someone else's car.

Medical Payments Medical payment insurance covers the person driving the car and others riding in it, whether or not that driver is at fault. In Trevor's case this coverage protects him and the other members of his family when they ride in their own car or in another person's car.

Collision Coverage for **collision** pays for damage to Trevor's family's car if it is in an accident. Some people decline this coverage if their cars are not worth much. For example, if a car is worth less than \$1000, many people would not want to pay several hundred dollars a year for collision insurance.

Comprehensive Physical Damage Coverage for comprehensive physical damage pays for damages that result from a fire, falling object, theft, flood, earthquake, and the like. The accident that Trevor witnessed was not caused by any of these events.



Uninsured and Underinsured Motorist Protection Coverage for uninsured and underinsured motorist protection pays for personal expenses due to an accident if it can be shown that the driver of the other car was at fault and if the other driver has little or no bodily injury liability coverage.

THE COST OF INSURANCE

Naturally, it costs more to insure a car that is worth \$40,000 than one that is worth \$8000. In addition to the value of cars, insurance companies keep records of all kinds of driving-related accidents. They have found that accidents are more likely to occur in some places than in others. These companies also keep track of driver characteristics and their relationship to accidents. Insurance companies charge higher rates for people and places that they find are more often involved in accidents.

In the Reference Section of the text you will find a table entitled Driver Rating Factors. The **driver rating factor** is based on characteristics such as age, sex, whether the person is married, the kind of driving done, and whether the driver has been through a driver training program. The base premium is multiplied by the appropriate factor to find the premium for a specific individual.

Ask Yourself

1. What is liability?
2. What is bodily injury liability insurance?
3. What is property damage liability insurance?
4. What does comprehensive physical damage insurance cover?

ALGEBRA REVIEW

Given the equation $p = rb$

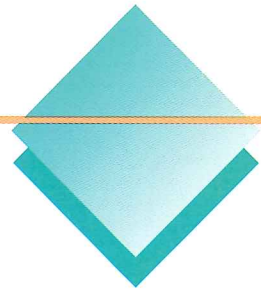
1. Find p when $r = 1.8$ and $b = 525$.
2. Find p when $r = 2.25$ and $b = 980$.
3. Find p when $r = 4.4$ and $b = 1200$.
4. Find r when $p = 2015$ and $b = 3.1$.
5. In general, what happens to the value of p if r is unchanged and b decreases?

Given the equation $p = \frac{e}{n} + h$

6. Find p if $e = 568,500$, $n = 10,000$, and $h = 90$.
7. Find e if $p = 52.80$, $n = 10,000$, and $h = 30$.
8. Find n if $p = 825.86$, $e = 72,586,000$, and $h = 100$.
9. Find h if $p = 591$, $e = 526,000$, and $n = 65$.
10. In general what happens to p if e and h are unchanged and n increases?

SHARPEN YOUR SKILLS

Trevor is now looking at actual insurance costs. Through a friend who works for an insurance company, he has obtained the following table of basic rates.



AUTOMOBILE INSURANCE, SIX-MONTH BASIC RATE SCHEDULE						
Car Class Rating	Collision Deductible			Comprehensive Deductible		
	\$100	\$500	\$250	\$250	\$50	\$500
1-10	\$ 500	\$ 430	\$ 370	\$140	\$130	\$110
11-20	820	750	690	350	310	280
21-30	1140	1040	940	450	410	370
31-40	1280	1190	1100	670	610	560

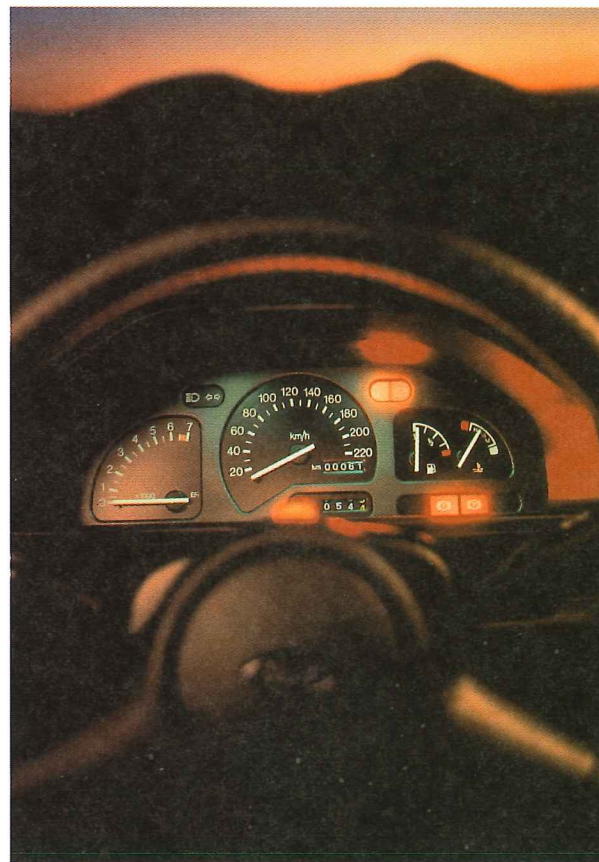
Trevor noticed that several factors affect basic rates. One is the car class rating. This rating reflects the resale value of the car. Another factor is the amount of the **deductible**, the first expenses that are not covered by insurance. The deductible is a way of reducing insurance rates. In the case of bills resulting from an accident or injury, the insured person pays the deductible amount before the insurance company begins to pay. The higher the deductible, the more you pay yourself and the lower your **premium**, that is, the amount you pay for your insurance. For example, if repairs after an accident cost \$1000 and your deductible is \$250, then you pay \$250, and the insurance company pays \$750.

The insurance premium is dependent on the driver rating factor r and the basic rate b for the car. The six-month basic rate is found in the table at the top of this page or in the Reference Section. The driver rating factor is found in a Driver Rating Factor Table in the Reference Section. Note there are three tables, one for each of these categories: married youths, unmarried youths, and all adults.

Annual Insurance Premium Formula

$$p = 2rb$$

where p = the annual premium paid to the company
 r = the driver rating factor
 b = the six-month basic rate for the car



SKILL 1

EXAMPLE 1 Trevor is 17 years old. He has had driver training. He is single. He is not the owner or principal operator of the car that he drives. He does errands in the car. He does not use the car to drive to work.

QUESTION According to the Driver Rating Factors Table, what is Trevor's rating factor?

SOLUTION

First find the table, Part II, Unmarried Youths. Trevor is 17, so you use the top half of the table and the section marked M. Trevor is not the owner or usual driver, but he has had driver education and does not drive to work. Thus, working your way across the table, you find that his rating is 2.45.

SKILL 2

EXAMPLE 2 Trevor is driving his family's car, which has a car class rating of 8. He plans to purchase collision insurance with a deductible of \$500.

QUESTION How can you use the premium equation to find Trevor's annual premium?

SOLUTION

The basic rate for Trevor is found in the Automobile Insurance table at the top of the previous page. Look in the collision half of the table (left side) in the column under \$500 and the row 1–10. Thus the basic rate is \$430.

Using the equation

$$p = 2rb$$

gives

$$p = 2(2.45)(430) = 2107$$

The annual premium is \$2107.

SKILL 3

EXAMPLE 3 One insurance company is considering a new policy for young people aged 14 and 15. The policy will insure them for injuries sustained as passengers riding in a car. Some parents are interested in this because their children in this age range are often passengers in cars driven by new, 16- or 17-year old drivers who lack adequate insurance.

The insurance company must decide on the price of a premium. Their records show that for every 10,000 14- and 15-year-old passengers, there are 425 accidents resulting in personal injuries. The medical costs of these injuries average \$3800 per person. The company must also receive \$35 per policy to cover overhead and profit.

QUESTION What should be the premium for the new policy?

SOLUTION

The premium can be found by considering the total estimated expense for the population, then dividing the amount by the total number of policies paying premiums. Then the overhead must be added.



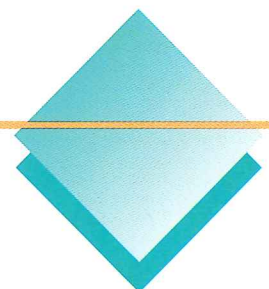
Algebraically, the cost of the premium can be expressed as

$$p = \frac{e}{n} + o \quad \begin{array}{l} \text{where } p = \text{premium} \\ e = \text{expense paid out} \\ n = \text{number paying premiums} \\ o = \text{overhead per premium} \end{array}$$

$$p = \frac{425(3800)}{10,000} + 35 \\ = 196.50$$

The company's figures suggest a premium of \$196.50.

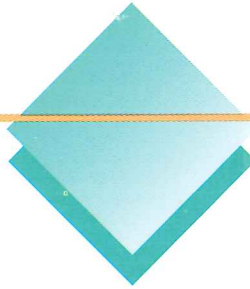
TRY YOUR SKILLS



1. Use the Driver Rating table to find the rating for a married female youth, 20 years old, who owns her own car, has not had driver training, and drives the car to work.
2. Use the Automobile Insurance table to find the premium for comprehensive coverage, with a \$250 deductible, on a car with a class rating of 12.
3. Write an algebraic equation for finding the annual insurance premium based on the six-month basic rate for the car and the driver rating factor. Explain each part of the equation.

Insurance records show that of 10,000 drivers in a certain class, 1378 were in accidents with an average cost to the insurance company of \$6089.

4. What is the average cost per person insured?
5. If the company overhead is \$95 per policy, what should the company charge as a premium?



EXERCISE YOUR SKILLS

KEY TERMS

collision
deductible
driver rating factor
liability
premium

1. Why do laws require drivers to be financially responsible for damage to other people or their property?
2. Why is it important for drivers to have adequate medical payment coverage?
3. What is the difference between a premium and a deductible?
4. What is the advantage in having a deductible in insurance coverage?

Use the Driver Rating Factors Table in the Reference Section to find the driver rating factor for each of the following individuals.

5. A 19-year-old female without driver training who drives to work, and is not the owner or usual driver of the car.
6. A 19-year-old unmarried male without driver training who drives to work and is not the owner or usual driver.
7. A 17-year-old female with driver training who drives to work and is the owner.
8. A 22-year-old female with or without driver training who drives to work and is the owner.
9. The usual driver of the car, 33 years of age, who drives to work.
10. The usual driver of the car, 65 years of age, who does not drive to work.

Use the Six-Month Basic Rate Schedule and the Driver Rating table to find the total six-month premiums in Exercises 11–15.

	Driver Rating Factor	Car Class Rating	Collision Deductible	Comprehensive Deductible	Six-Month Premium
11.	2.25	15	\$500	\$ 50	
12.	1.00	32	250	250	
13.	2.40	9	500	500	
14.	0.80	23	100	500	
15.	1.10	10	500	250	

16. An insurance company's records show that for every 10,000 drivers in a certain category there are 1067 accidents with an average cost to the company of \$12,400 each. The company charges an overhead amount of \$125 per premium. On the basis of these figures, what premium should be charged for a policy in this category?
17. The AVR insurance company's records show that for every 100,000 drivers in a certain category there are 2311 accidents with an average cost to the company of \$18,200. For this category the company charges an overhead of \$190 per premium. What should be the premium to cover costs?

18. What are some of the differences between the ways in which an insurance company and an individual look at an insurance policy?
19. What are some of the factors that lead an insurance company to raise or lower the premiums every year?

MIXED REVIEW

1. You are a real-estate agent and you sold a house for \$120,000 earning a commission of 3% on the first \$100,000 and 6% on the amount above \$100,000. What was your commission?

A loan of \$6000 is repaid one year later in a single payment of \$6600.

2. What was the interest paid on the loan?
3. What was the rate of interest on the loan?
4. A person buys a \$100,000 whole life insurance policy at age 30. Use the table entitled Accumulated Cash Value of \$100,000 Whole Life Policy in the Reference Section to find the cash value of the policy when the person retires 20 years later.

Find the cost of these shares of stock. The cost includes a commission of 1.5%.

5. 50 shares at $\$35\frac{1}{2}$ a share
6. 1,000 shares at $\$9\frac{7}{8}$ a share

Use the Comparison Table for Term and Whole Life Premiums on page 326, the table showing Accumulated Cash Value of \$100,000 Whole Life Policy on page 345, and the formula for the Future Value of a Periodic Investment to answer Exercises 7 and 8.

7. Find how much tax-deferred money a 25-year-old person could expect to accumulate between the ages of 25 and 30 by buying a \$100,000 term policy instead of a more expensive whole life policy. The money saved will be invested into an IRA that should earn 8% a year.
8. For the person in Exercise 5, compare the cash value of a whole life insurance policy after 5 years with the value of the IRA at the end of 5 years. Which seems to be the more profitable investment?

The Tierney family consists of Mr. and Mrs. Tierney and their three dependent children. Last year, the family had salary income of \$47,500, interest income of \$1457, and dividend income of \$2869. Their IRA contribution was \$1750. The allowable deductions were real-estate taxes of \$1690, local income taxes of \$2100, and mortgage interest on their home of \$5980.

9. Determine whether the family is better off itemizing their deductions or using the standard deduction. What is the deduction that the family should take?
10. Use IRS Form 1040 and Schedule A to find the Tierneys' income tax for the previous year.

CHAPTER 10 REVIEW

1. When financing a car, what factors cause monthly payments to be higher and what factors cause them to be lower?
2. What is meant by straight-line depreciation?
3. If you purchase a new car, what will probably be the most costly factor in operating the car?
4. How would you describe the depreciation of most cars?
5. What are some of the causes contributing to the variation in insurance rates?

The following is a portion of the price list for a new car.

Item	Dealer's Cost	Sticker Price
4-door sedan	\$13,460	\$16,152
Air conditioning	420	483
AM/FM radio, tape deck	750	877.50
Full-size spare tire	120	160

6. Find the markup for the car without options.
7. Find the percent of markup of the car without options.
8. Find the markup and percent of markup for each of the options.
9. Find the markup and percent of markup for the car with all options.

A car with a selling price of \$16,800 can be financed for

- (a) 20% down and 6% annual interest rate with three years to pay
- (b) 10% down and 7.2% annual interest rate with four years to pay

10. Find the monthly interest rate for an annual rate of 6%.
11. Find the monthly payment under terms (a).
12. Find the monthly payment under terms (b).
13. Find the amount of interest and principal in the first month's payment under terms (a).
14. Find the amount of interest and principal in the first month's payment under terms (b).
15. Find the annual depreciation of the car for 10 years with straight-line depreciation.
16. Draw a graph showing the resale value of the car with the following annual depreciation percents, starting with the purchase of the car: 25, 20, 15, 12, 10, 8, 5, 3, 2.
17. With the depreciation given in Exercise 16, what will be the resale value of the car at the beginning of the fifth year?