

CONSUMER MATHEMATICS 7

TRANSPORTATION

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AUTOMOBILE OPERATING COSTS

Automobile operating costs include such things as gas, oil, repairs, parts, maintenance, depreciation, insurance, and license fees. You should assume that the price given for gas and oil includes taxes.

PROCEDURE

To calculate gas and oil charges as a cost per mile driven, divide the amount spent on gas and oil by the number of miles driven.

$$\text{cost per mile gas \& oil} = \frac{\text{cost gas \& oil}}{\# \text{ miles driven}}$$

$$\# \text{ miles driven} = \frac{\text{cost gas \& oil}}{\text{cost per mile gas \& oil}}$$

Model 1: Your total gas and oil charges for the year amount to \$1,080. You estimate that you drove 14,000 miles during the year. What is the cost in cents per mile for gas and oil?

$$\text{Cost} = \frac{\$1,080}{14,000} = \$0.077, \text{ or } 7.7\text{¢ per mile}$$

Model 2: Your automobile gets about 16 miles to the gallon. You drive 16,000 miles. If the cost at the pump is \$1.10 per gallon, and you also paid for 10 quarts of oil at \$1.75 per quart, what is the cost of gas and oil per mile?

$$\text{Gallons purchased} = \frac{16,000}{16} = 1,000$$

$$\text{Cost of gas} = 1,000 \times \$1.10 = \$1,100.00$$

$$\text{Cost of oil} = 10 \times \$1.75 = \$17.50$$

$$\text{Total cost of gas and oil} = \$1,100.00 + \$17.50 = \$1,117.50$$

$$\text{Cost of gas and oil} = \frac{\$1,117.50}{16,000} = \$0.07 \text{ or } 7\text{¢ per mile.}$$

PROCEDURE

To determine the cost per mile for repairs, parts, and maintenance, divide the total cost of these items by the number of miles driven.

$$\text{cost per mile repairs, parts, maintenance} = \frac{\text{cost repairs, parts, maintenance}}{\# \text{ miles driven}}$$

Model 1: You determine that you paid \$48.50 for parts, \$250 in repair bills not covered by insurance, and \$178 in service costs during the past year. Your odometer shows that you drove the car 15,000 miles during the year. What is the cost per mile for these operating costs?

Parts =	\$ 48.50
Repairs =	250.00
Servicing =	<u>178.00</u>
(maintenance)	
Total =	\$476.50

Operating costs = $\frac{\$476.50}{15,000} = \0.0318 , or
3.2¢ per mile.

Model 2: Repairs = \$480
Parts = \$275
Maintenance = \$360
Miles driven = 18,500
Operating costs?

Total cost of operating for
costs listed = \$480 + \$275 + \$360
= \$1,115
Operating costs = $\frac{\$1,115}{18,500} = \0.06 , or 6¢
per mile.

DEFINITION

Depreciation is a lessening, or lowering, in value of an asset based upon its age.

You should learn how to determine the cost of depreciation relative to your automobile. The loss in value is the difference in the original value of your automobile and the resale or salvage value at the time your automobile is traded or scrapped.

Some manufacturers advertise high resale value because alert buyers know that this characteristic lessens the overall cost of owning an automobile.

PROCEDURE

To determine the cost of depreciation per mile driven: (1) Subtract the estimated trade-in or salvage value from the original cost of the automobile; (2) divide the resulting loss in value by the number of years of use to get the average yearly depreciation; and (3) divide the average yearly depreciation by the average number of miles driven to obtain the depreciation cost per mile driven.

Model 1: You purchased a car five years ago for \$3,400. You trade it in for \$350 on a new car. If you averaged 20,000 miles of driving per year, what was the cost of depreciation per mile driven?

$$\text{Total depreciation} = \$3,400 - \$350 = \$3,050$$

$$\text{Average yearly depreciation} = \frac{\$3,050}{5} = \$610$$

$$\text{Cost of depreciation} = \frac{\$610}{20,000} = \$0.03, \text{ or } 3\text{¢ per mile.}$$

Model 2: You drive a Mercury for 8 years and sell it for \$50 to a salvage company. It originally cost you \$13,650 new. The odometer registered 92,000 miles when you scrapped the car. What was the cost of depreciation per mile driven?

$$\text{Total depreciation} = \$13,650 - \$50 = \$13,600$$

$$\text{Cost of depreciation} = \frac{\$13,600}{92,000} = \$0.14, \text{ or } 14\text{¢ per mile.}$$

Work the following automobile-operating costs problems.

- 1.7 Gas and oil costs = \$1,200
Miles driven = 12,500
Cost per mile?

- 1.8 Gas and oil costs = \$1,024
Cost per mile = 8¢
Miles driven?
(miles = $\frac{\text{cost}}{\text{rate per mile}}$)

- 1.9 Gas mileage = 15.5 miles per gallon
Miles driven = 14,500
Price of gasoline = \$1.20 per gallon
Cost of oil used = \$16.50
Cost per mile for gas and oil?
-
- 1.10 Cost of repairs = \$225
Cost of parts = \$165
Cost of maintenance = \$312
Miles driven = 17,500
Cost per mile?
-
- 1.11 Cost of repairs = \$55
Cost of parts = \$3.50
Average cost of maintenance = \$8.50 per month
Miles driven = 13,000
Cost per mile?
-
- 1.12 Cost of repairs = \$0
Cost of parts = \$165
Cost of maintenance = \$155
Cost of parts and maintenance per mile = 3.2¢
Miles driven?
-
- 1.13 Purchase price = \$5,750
Market value at resale = \$3,250
Years driven = 4
Average number of miles driven per year = 16,025
Cost of depreciation per mile?
-
- 1.14 Purchase price of automobile = \$3,850
Salvage value = \$150
Years driven = 9
Average number of miles driven per year = 18,000
Cost of depreciation per mile driven?
-

- 1.15 Purchase price of automobile = \$6,600
Resale value = \$3,900
Years driven = 3
Cost of depreciation per mile driven = 9¢
Average number of miles driven per year?
-
- 1.16 Purchase price of automobile = \$7,885
Years driven = 5
Cost of depreciation per mile driven = 8.5¢
Average number of miles driven per year = 15,000
Resale value?
-

(Hint: First find the average depreciation per year by multiplying the average miles driven by the cost of depreciation per mile driven. Then substitute the resulting figure into the formula for computing depreciation per year to find the resale value.)

INSURANCE COST COMPARISONS

Insurance premiums are a major cost in owning an automobile. This high cost is partly because of the large number of car accidents. Statistics show that almost every driver in this country will have been in an automobile accident within ten years of driving.

Other reasons for rising insurance rates are higher costs of accident repairs and medical services due to inflation, larger judgments awarded by courts in settling *liability* suits, and legal fees and overhead costs that amount to 56 cents out of every \$1 paid for insurance.

Buying appropriate insurance coverage is not an easy task. The different types of coverage that are offered, the discounts that are given to certain categories of drivers, and the varying state requirements all tend to confuse the average automobile owner in his search for adequate protection.

Any driver and especially teenagers, since their insurance costs are high, should realize that safe driving is not only a good Christian testimony but it also saves hundreds of dollars. Traffic tickets and accidents greatly increase insurance costs and they take the joy out of using what God has provided for your good.

Additionally, Christians should realize that the great majority of auto insurance policies assign the right of subrogation to the insurance company. That right enables