



MEA 2013-2014
Teacher: Claudia Valle
Start Date:

Course: Math Models B
Student: _____
Completed Date:

Unit 1: Personal Finance

Objectives: Students will use functional relationships to solve problems related to personal finance.

Essential Questions: What factors should you consider when planning to make a large purchase?

TEKS Standards: M.1.A, M1.B, M.1.C, M.5.A, M.5.B, M.5.C, M.6.B, M.6.C, M.7.A, M.7.B

Mathematical Models with Applications

(1) The student uses a variety of strategies and approaches to solve both routine and non-routine problems. The student is expected to:

(A) compare and analyze various methods for solving a real-life problem;

(B) use multiple approaches (algebraic, graphical, and geometric methods) to solve problems from a variety of disciplines; and

(C) select a method to solve a problem, defend the method, and justify the reasonableness of the results.

(5) The student uses functional relationships to solve problems related to personal income. The student is expected to:

(A) use rates, linear functions, and direct variation to solve problems involving personal finance and budgeting, including compensations and deductions;

(B) solve problems involving personal taxes; and

(C) analyze data to make decisions about banking.

(6) The student uses algebraic formulas, graphs, and amortization models to solve problems involving credit. The student is expected to:

(B) use amortization models to investigate home financing and compare buying and renting a home; and

(C) use amortization models to investigate automobile financing and compare buying and leasing a vehicle.

(7) The student uses algebraic formulas, numerical techniques, and graphs to solve problems related to financial planning. The student is expected to:

(A) analyze types of savings options involving simple and compound interest and compare relative advantages of these options;

(B) analyze and compare coverage options and rates in insurance; and

Turn In:

Assignment #	Activity	TEKS
1	Working Out Wages	M.1.A, M1.B, M.1.C, M.5.A
2	Where's the Money?	M.1.A, M1.B, M.1.C, M.5.A, M.5.C, M.6.B, M.6.C, M.7.A, M.7.B
3	Where Does It All Go?	M.1.A, M1.B, M.1.C, M.5.A, M.5.B
4	Options in Banking	M.1.A, M1.B, M.1.C, M.5.C
5	Options in Savings	M.1.A, M1.B, M.1.C, M.7.A
6	Exploring Savings and Loans Using Technology	M.1.A, M1.B, M.1.C, M.5.C
7	Rolling on Down the Road	M.1.A, M1.B, M.1.C, M.6.C
8	Home Sweet Home	M.1.A, M1.B, M.1.C, M.6.B
9	Ins and Outs of Insurance	M.1.A, M1.B, M.1.C, M.7.B
10	Tying Up Personal Finance	M.1.A, M1.B, M.1.C, M.5.A, M.5.B, M.5.C, M.6.B, M.6.C, M.7.A, M.7.B
11	Unit 1 Test	M.1.A, M1.B, M.1.C, M.5.A, M.5.B, M.5.C, M.6.B, M.6.C, M.7.A, M.7.B

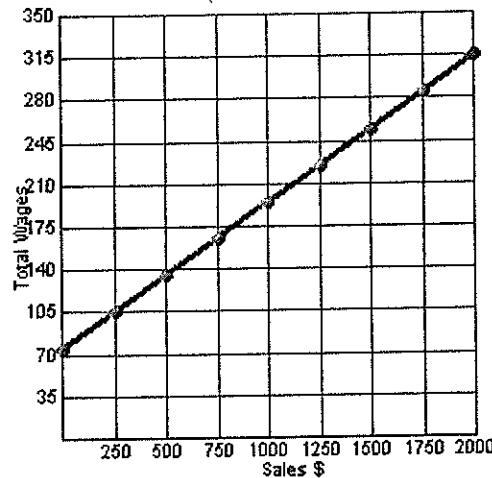
Notes / Examples

Working Out Wages KEY

Boutique is hiring one person to work during the summer. The wages will be \$75 per week plus a 12% commission on sales.

1. Make a table representing the weekly pay in relation to amount of sales. Use the table to determine a rule to represent the relationship.
2. Create a scatter plot to represent the relationship. Label and scale axes over an appropriate domain and range.

Boutique Wages	
Sales \$	Total Wages \$
0	75
250	105
500	135
750	165
1000	195
1250	225
1500	255
1750	285
2000	315
x	$0.12x+75$



3. What are the independent and dependent variables?
Independent – Sales Dependent – Total Wages
4. Is the relation a function? Explain.
It is a function, since each amount of sales (x) has exactly one wage (y) value.
5. Is the relation increasing or decreasing?
The relation is increasing because as x increases y also increases. (Up from left to right)

6. What is the rate of change $\left(\frac{\text{Change in output}(y)}{\text{Change in input}(x)}\right)$ in the data table?

$$\frac{30}{250} = 0.12$$

7. How is the rate of change determined from the scatter plot? The ratio of the vertical rise to the horizontal run. Vertical rise $315 - 105 = 210$ to horizontal run $2000 - 250 = 1750$

$$\frac{210}{1750} = \frac{0.12}{1}$$

Notes / Examples

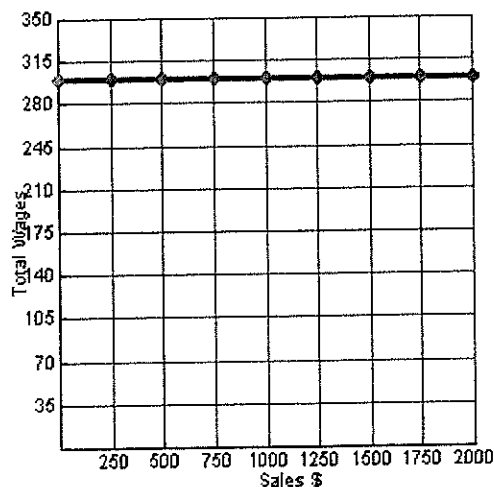
Working Out Wages KEY

- How can the rate of change be determined from the rule for the relationship? The coefficient of the x term is the rate of change (0.12). $y = 0.12x + 75$
- Is the relationship a direct variation or proportional relationship? Explain your reasoning. No, it is not a direct variation. Although the function is linear, it is not a direct variation because it does not go through the origin and the rule is not in the algebraic form $y = kx$.
- How does the rate of change in the table, graph, and function rule compare with the verbal description in the problem situation? The rates of change matches the percent commission made from sales, $12\% = 0.12$.
- If \$2600 in merchandise is sold by the employee during the week, what would be his total wages?
 $y = 0.12(2600) + 75 = 387$
If the employee sold \$2,600 in merchandise, his weekly wage would be \$387.
- If the total wages were \$495 in a week, what amount of merchandise did the employee sell during the week? They would have sold \$3,500 in merchandise.

Pets is hiring one person to work during the summer. Pets will pay a set salary of \$300 per week.

- No matter what the sales, how much will the employee make for the week? \$300
- Is this relationship a function? What type of function? Find a rule to represent the relationship.
Yes, it is a constant function. $y = 300$
- Make a table representing the weekly pay in relation to amount of sales. Use the table to determine a rule to represent the relationship.
- Create a scatter plot to represent the relationship. Label and scale axes over an appropriate domain and range.

Pet Wages	
Sales \$	Total Wages \$
0	300
250	300
500	300
750	300
1000	300
1250	300
1500	300
1750	300
2000	300
x	300



Notes/Examples

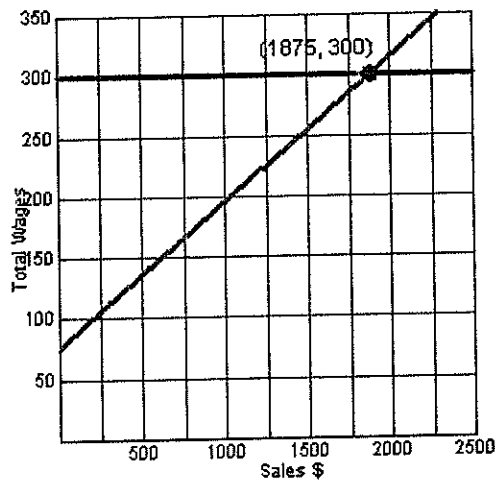
Working Out Wages KEY

Before accepting one of the jobs, it is important to analyze both types of wages.

17. Make a table showing both wages as a relationship with sales. What does the table show about the wages?

Sales \$	Boutique Wages \$	Pets Wages \$
1750	285	300
1800	291	300
1850	297	300
1875	300	300
1900	303	300
1925	306	300
2000	315	300
x	$0.12x+75$	300

18. Graph both functions on the same coordinate plane.



19. What do the table and graph show about the wages? The weekly wages for Pets is higher than Boutique until the sales reaches \$1875. At that point the weekly wages are the same for both Pets and Boutique. If sales go over \$1875, then the employee would make more at Boutique.
20. Explain how other variables besides money may affect the job chosen. Answers will vary.

Working Out Wages

Practice Problem

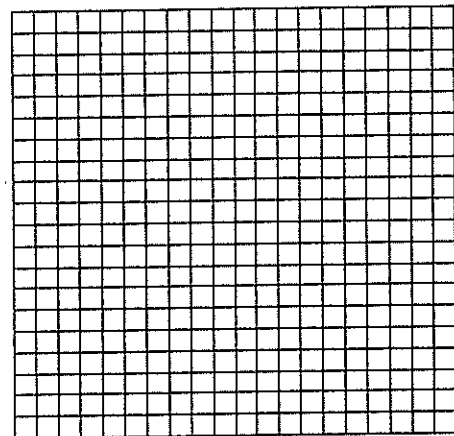
Jalynn has taken a job at the Ice Cream Parlor for the summer. She will be making \$8.50 per hour. She can only work up to 40 hours a week, since the Ice Cream Parlor does not want to pay overtime hours.



- Construct a table to represent the income earned as a function of time worked.

Hours	Earnings
0	
10	
20	
30	
40	
x	

- Graph a scatter plot of the data.
- What are the independent and dependent variables?
- What is an appropriate domain and range for the situation?
- What parent function best represents the data?
- Determine a function rule to represent the data.
- Does the function represent a direct variation? Explain your reasoning.
- How much will Jalynn earn if she works 38.75 hours in the week?
- How much will Jalynn earn if she works 32.12 hours in the week?
- If Jalynn's weekly gross pay was \$242.25, how many hours did she work in the week?



Income Statistics in the United States

Households		Median Income Levels							
		Persons, age 25 or older with earnings			Household income by race				
All households	Dual earner households	Per household member	Males	Females	Both	Asian	White Non-Hispanic	Hispanic	Black
\$46,326	\$67,348	\$23,535	\$39,403	\$26,507	\$32,140	\$57,518	\$48,977	\$34,241	\$30,134
Median Personal Income by Educational Attainment									
Measure	Some High School	High School Graduate	Some College	Associate Degree	Bachelor's Degree or higher	Bachelor's Degree	Master's Degree	Professional Degree	Doctorate Degree
All persons, age 25+	\$20,321	\$26,505	\$31,054	\$35,009	\$49,303	\$43,143	\$52,390	\$82,473	\$70,853
Male Age 25+	\$24,192	\$32,085	\$39,150	\$42,382	\$60,493	\$52,265	\$67,123	\$100,000	\$78,324
Female Age 25+	\$15,073	\$21,117	\$25,185	\$29,510	\$40,483	\$36,532	\$45,730	\$66,055	\$54,666
Household	\$22,718	\$36,835	\$45,854	\$51,970	\$73,446	\$68,728	\$78,541	\$100,000	\$96,830
Household Income Distribution									
Bottom 10%	Bottom 20%	Bottom 25%	Middle 33%	Middle 20%	Top 25%	Top 20%	Top 5%	Top 1.5%	Top 1%
\$0 to \$10,500	\$0 to \$18,500	\$0 to \$22,500	\$30,000 to \$62,500	\$35,000 to \$55,000	\$77,500 and up	\$92,000 and up	\$167,000 and up	\$250,000 and up	\$350,000 and up

SOURCE: US Census Bureau, 2006; income statistics for the year 2005

Notes/Examples

Where's the Money? KEY

A wage is a compensation which workers receive in exchange for their labor. In the United States, the laws governing wages and payment for services rendered were first codified by the *Fair Labor Standards Act* of 1938.

- A salary is a form of periodic payment from an *employer* to an *employee*, which is specified in an *employment contract*. The salary is set at a specific amount no matter how many hours are worked.
- Piece wages are forms of payment where each job, hour, or other unit is paid separately. In the United States hourly wages must meet a minimum hourly rate and provide for overtime.
- Commission is usually a percentage of goods sold. Commission is sometimes used in addition to a fixed salary.

Complete the table below. Round off to the nearest cent.

	Gross pay per year	Gross pay per month	Gross pay bimonthly	Gross pay per week
Salary of \$36,000 per year	X \$36,000	$X/12$ \$3,000	$X/24$ \$1,500	$X/52$ \$692.31
Hourly rate of \$9.50 per hour, 40 hours per week, projected 80 hours of overtime in one year at time and a half, and 16 hours of holidays worked at double time	$9.5(40)(52)$ $+$ $14.25(80)$ $+$ $19(16)$ \$21,204	\$1,767	\$883.50	\$407.77
Salary of \$24,000 plus 5% of sales if sales are projected at \$125,000	\$30,250	\$2,520.83	\$1,260.42	\$581.73

Notes/Examples

Where's the Money? KEY

Gross pay is the sum of all money paid in a given period of time. Net pay is the amount remaining after deductions are made from the gross pay.

Types of deductions

- Federal income tax
- Social security
- Medicare
- Insurance
- Retirement funds

Calculate the net pay after the following deductions, if gross pay for a month is \$3,000. Which deductions are voluntary on the part of the employee?

Insurance and retirement fund are voluntary on the part of the employee, although very necessary.

- a. Federal income tax for a Single person (Dollar amounts indicate projected yearly income.)
Income tax deduction = $0.25(3000) = \$750.00$

Tax Rate	Single	Married Filing Jointly or Qualified Widow(er)	Married Filing Separately	Head of Household
10%	\$0 – \$8,025	\$0 – \$16,050	\$0 – \$8,025	\$0 – \$11,450
15%	\$8,026 – \$32,550	\$16,051 – \$65,100	\$8,026 – \$32,550	\$11,451 – \$43,650
25%	\$32,551 – \$78,850	\$65,101 – \$131,450	\$32,551 – \$65,725	\$43,651 – \$112,650
28%	\$78,851 – \$164,550	\$131,451 – \$200,300	\$65,726 – \$100,150	\$112,651 – \$182,400
33%	\$164,551 – \$357,700	\$200,301 – \$357,700	\$100,151 – \$178,850	\$182,401 – \$357,700
35%	\$357,701+	\$357,701+	\$178,851+	\$357,701+

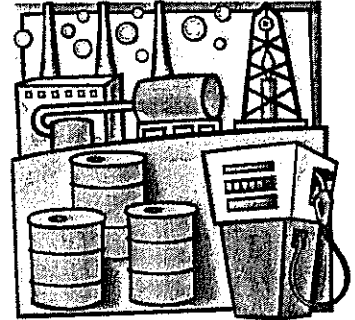
- b. Social security tax at 6.2% of gross income $0.062(3000) = \$186.00$
 c. Medicare at 1.45% of gross income $0.0145(3000) = \$43.50$
 d. Employee part of insurance is \$75. \$75.00
 e. Retirement fund 5% of gross income $0.05(3000) = \$150$
 Net Pay = $3000 - (750 + 186 + 43.50 + 75 + 150) = \1795.5

Where's the Money?

Practice Problems

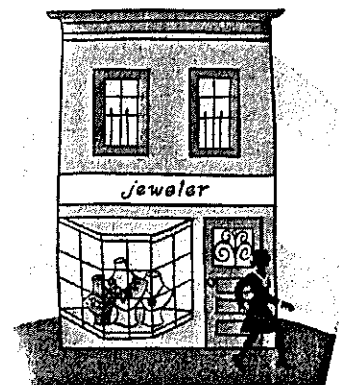
Round off all money to the nearest cent.

1. Jason works at PetCo Refinery for \$12.50 per hour. He also gets overtime pay (time and a half) for all hours over 40 that he works in a week. If he works holidays, he gets double time for the hours in that day, but they are not counted toward overtime. The table below shows the hours that Jason worked in the last two weeks.
 - a. What would be his gross pay for the two weeks?
 - b. What will be his net pay for the two weeks following deductions (income tax for a married filing jointly, social security 6.2% of gross, Medicare 1.45% of gross, retirement fund 3% of gross)?



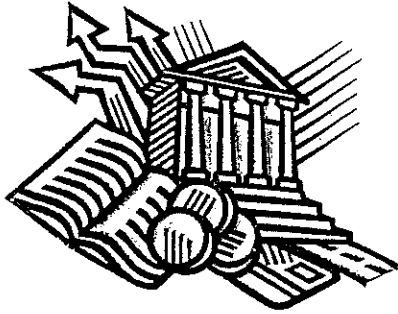
	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Week 1	8 hrs	8 hrs	8 hrs	8 hrs	8 hrs	8 hrs	Off
Week 2	8 hrs	10 hrs	8 hrs Christmas Holiday	8 hrs	8 hrs	8 hrs	Off

2. Elsa is paid a monthly salary of \$1,500 plus a commission of 9.5% on all sales of merchandise at a local jewelry store. She sold \$15,600 in merchandise last month.
 - a. What was her gross pay last month?
 - b. What was her net pay following deductions (income tax head of household, social security 6.2% of gross, Medicare 1.45% of gross, insurance \$185)?



Notes/Examples

Options in Banking KEY



A bank is a financial institution that

- acts as a payment agent for customers by conducting current accounts, paying checks or debits drawn on the accounts, and collecting checks or debits.
- offers various savings options.
- borrows and lends money.

Commercial banks are regulated and require a bank license to operate. Banks in the United States provide almost all payment services, and a bank account is considered indispensable by most businesses, individuals, and governments.

Channels to access banking services include:

- Local bank branch
- ATM
- Direct mail
- Telephone banking
- Online banking

Online banking (or Internet banking) allows customers to conduct financial transactions on a secure website. This allows customers to conduct their bank business online, including bill payment, money transfers, investment sales and purchases, loan payments, and viewing bank account records.

What are some of the benefits of keeping money in a banking institution as opposed to carrying cash?

Answers will vary. Sample: Not as easy to get stolen, records of transactions, better management of funds, and easier access to funds

Notes/Examples

Options in Banking KEY

Bank Loans

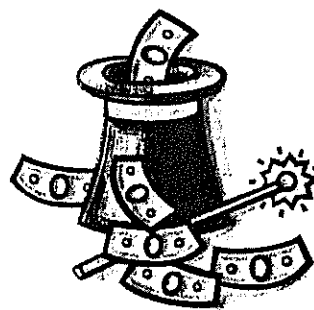
Acting as a provider of loans is one of the principal tasks for banks. A bank loan is a type of debt. The borrower receives an amount of *money* from the bank or lender, which they pay back in regular installments to the bank or lender. This service is generally provided at a cost, referred to as interest on the *debt*.

Two types of loans are possible

- Secured loans – Collateral (borrower's asset) is used to back the loan, such as the lien on the title to a house until the mortgage is paid in full.
- Unsecured loans – No borrower's asset is used to secure the loan such as credit cards, bank overdrafts, and personal loans.

One type of loan is based on simple interest.

<p style="text-align: center;">Simple Interest $I = Prt$</p> <p style="text-align: center;">Maturity Value $M = P + I$</p> <p style="text-align: center;">I = interest, P = principal, t = time in years, r = % rate written in decimal form</p>
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Sample:

1. A loan for \$4,500 is made by Bangkok Bankers. The loan is taken out for 2 years at a simple interest rate of 8.75%.
 - a. Calculate the total interest for the period of the loan.
 $I = (4500)(0.0875)(2)$
 $I = \$787.50$
 - b. Calculate the maturity value at the end of the loan period.
 $M = 4500 + 787.50$
 $M = \$5287.50$

Some loans are paid in full at the end of the loan period. Most loans, however, require that the borrower pay off the loan in regular installments.

2. If the loan above were to be paid off monthly, what would be the loan payment per month?
Two years = 24 monthly payments
 $5287.50 \div 24 = \$220.31$ with a final payment of \$220.37

Options in Banking

Practice Problems

- Shaquill borrowed \$1,250 for tuition and books on a short-term bank note. The note will be due in six months and is at a simple interest rate of 7.25%.
 - How much interest will Shaquill pay for borrowing the money?
 - How much will Shaquill owe the bank at the end of the six month period?
- \$10,000 is borrowed at 6.75% simple interest.

a. Complete the table below.

Time period of loan (yrs)	Interest \$	Maturity Value \$	Monthly Payment \$
1			
2			
3			
4			
5			
x			

b. Construct a scatter plot of interest as a function of time.

c. What function rule can be used to represent the relationship between the interest paid on the loan and the time of the loan?

d. Does the function represent a direct variation? Explain your reasoning.

e. What does the slope represent in the problem situation?

Options in Banking

f. Construct a scatter plot of maturity value as a function of time.

g. What function rule can be used to represent the relationship between the maturity value of the loan and the time of the loan?

h. Does the function represent a direct variation? Explain your reasoning.

i. What does the y-intercept represent in the problem situation?

j. What does the slope represent in the problem situation?

k. Construct a scatter plot of monthly payment as a function of time.

l. What function rule can be used to represent the relationship between the monthly payment and the time of the loan?

m. What parent function represents this relationship?

n. Is the relationship increasing or decreasing? How does this compare with the two previous relationships?

Notes/Examples

Options in Savings KEY

"Saving" generally means putting money aside for future use. Saving and investment, though closely related, are different. Saving can occur when putting money into a piggy bank or under the mattress, but that money is not being invested back into the economic community and is not growing in interest like it would in a bank or financial institution.

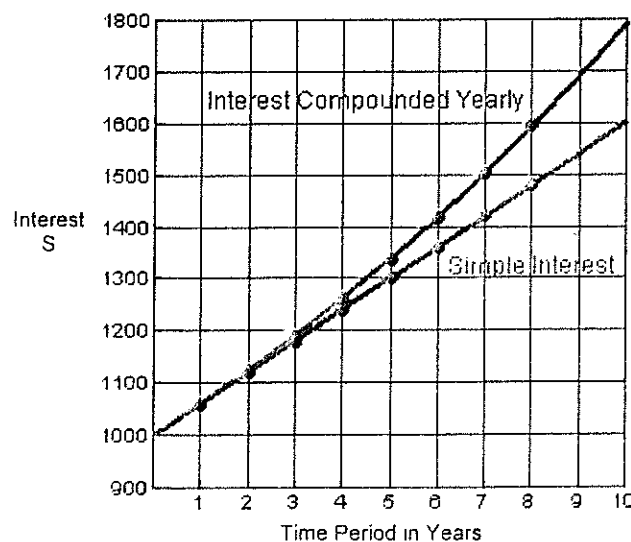


Most banks and credit unions pay compound interest on savings accounts. Compound interest pays interest on both the original deposit and also on any interest credited to the account.

Sample Problem

1. Compare the simple interest and compound interest (compounded yearly) on an original deposit of \$1,000 at 6% interest.

Time length of deposit in years	Amount in account using simple interest	Amount in account using compound interest
1	$1000 + (1000)(0.06)(1) = \1060	$1000 + (1000)(0.06) = \$1060$
2	$1000 + (60)(2) = \$1120$	$1060 + (1060)(0.06) = \$1123.60$
3	$1000 + (60)(3) = \$1180$	$1123.6 + (1123.6)(0.06) = \1191.02
4	$1000 + (60)(4) = \$1240$	$1191.02 + (1191.02)(0.06) = \1262.48
5	$1000 + (60)(5) = \$1300$	$1262.48 + (1262.48)(0.06) = \1338.23
6	$1000 + (60)(6) = \$1360$	$1338.23 + (1338.23)(0.06) = \1418.52
7	$1000 + (60)(7) = \$1420$	$1418.52 + (1418.52)(0.06) = \1503.63
8	$1000 + (60)(8) = \$1480$	$1503.63 + (1503.63)(0.06) = \1593.85
x	$1000 + 60x$	$y = 1000(1.06)^x$ (found by regression)



Notes/Examples

Options in Savings KEY

- What parent function best represents simple interest?
Linear parent function
- What parent function best represents compound interest?
Exponential parent function
- Enter the data for compound interest versus time into the graphing calculator and determine a function rule to represent compound interest in this problem situation.
 $y = 1000(1.06)^x$, r-value of approximately 1
- Use the function rules to determine the amount in the savings after the following time periods.

Years	Simple \$	Compound \$
10	1,600	1,790.85
20	2,200	3,207.14
50	4,000	18,420.15
100	7,000	339,302.08

- Which method of determining interest is best for the customer? Explain your reasoning. Definitely the compounding yearly is better than simple interest, especially the longer the money is in the account.

The general formula for calculating maturity value by compound interest is below.

Value at Maturity Using Compound Interest

$$A = P\left(1 + \frac{r}{n}\right)^{nt}$$

P = principal, t = time in years, n = total number of compounding periods per year, r = % annual interest rate written in decimal form



How does this formula compare with the one found in #c above?

$$y = 1000(1.06)^x$$

$$A = 1000\left(1 + \frac{.06}{1}\right)^{1x}$$

The principal is 1000, the rate is 0.06, it is paid yearly so the number of compounding periods per year is 1, and the total time in years in the problem was x .

Notes / Examples

Options in Savings KEY

Using the formula, smaller compounding intervals can be used. This will increase the growth of the account for the customer. Interest can be paid quarterly, monthly, daily, etc.

Quarterly: $A = P\left(1 + \frac{r}{4}\right)^{4t}$

Monthly: $A = P\left(1 + \frac{r}{12}\right)^{12t}$

Daily: $A = P\left(1 + \frac{r}{365}\right)^{365t}$

Sample Problem

2. Calculate the maturity value of a \$5000 deposit in a savings account paying 4% interest after 10 years if it is compounded a) quarterly, b) monthly, or c) daily. How do they compare? Which benefits the customer?

a) $A = 5000\left(1 + \frac{0.04}{4}\right)^{4(10)} = \7444.32

b) $A = 5000\left(1 + \frac{0.04}{12}\right)^{12(10)} = \7454.16

c) $A = 5000\left(1 + \frac{0.04}{365}\right)^{3650} = \7458.96

The more times it is compounded the more the account grows. Daily benefits the customer the most.

Options in Savings

Practice Problems

1. A flat screen television costs \$1600. It may be purchased for \$100 down and 24 easy monthly payments of \$80 each.
 - a. What is the total cost of the television if it is financed by this plan?
 - b. What are the finance charges (total interest)?
 - c. What simple interest rate was charged on the purchase per monthly payment?
 - d. What would be the annual percentage rate (APR)?

2. Tobias received an inheritance from his grandfather of \$20,000. When he gets out of college in 4 years he wants to use it as a down payment on a piece of lakeside property.
 - a. If he puts all the money in a savings account paying 6.5% interest compounded daily, how much money will be in the account at the end of the four years to use as the down payment on the property?
 - b. How much interest did he earn on the account?

3. Anna and Alice both received \$500 on their birthday from their aunt. Anna put hers in a savings paying a simple interest of 9.75%. Alice put hers in a savings paying an interest of 8.5% compounded monthly. At the end of five years which girl's account will have the most money?

4. The Henderson's have just moved to Rosewood. They are investigating the two banks in the town to determine where to put their \$15,000 savings. First National Bank of Rosewood pays an interest of 4.85% compounded quarterly. Security State Bank of Rosewood pays an interest of 4.75% compounded monthly.
 - a. Which bank should they chose, if they plan on leaving in 4 years?
 - b. What would be the difference in the amounts?
 - c. What other variables might influence which bank to chose?

Notes

Exploring Savings and Loans Using Technology KEY

The TI-graphing calculator has built in functions to work with finance under the APPS key.

Press the APPS key:

```
APPLICATIONS
1: Finance...
2: ALG1CH5
3: ALG1PRT1
4: AreaForm
5: CBL/CBR
6: CSheetDe
7↓CSheetEs
```

Select 1: Finance

```
CALC VARS
1: TVM Solver...
2: tvn_Pmt
3: tvn_I%
4: tvn_PV
5: tvn_N
6: tvn_FV
7↓InPVC
```

Select 1: TVM Solver

```
CALC VARS
1: TVM Solver...
2: tvn_Pmt
3: tvn_I%
4: tvn_PV
5: tvn_N
6: tvn_FV
7↓InPVC
```

The Time-Value-Money (TVM) variables represent the following:

N = total number of compounding periods (monthly for five years would be $12 \cdot 5 = 60$)

I% = interest rate left in percent form (6.5% enters as 6.5)

PV = present value or amount invested or borrowed

PMT = payment

FV = future value

P/Y = number of payments per year

C/Y = number of compounding periods per year

PMT:END BEGIN (highlight whether determining value at end or beginning of the period)

Notes/Examples

Exploring Savings and Loans Using Technology KEY

Sample Problem 1

If \$4,000 is invested at 7.5% compounded quarterly, what will be the value after 5 years?

$$N = 4 \cdot 5 = 20$$

I% = interest rate left in percent form = 7.5

PV = present value is negative because it is a cash outflow = -4000

PMT = payment will be zero since no money is added or deleted = 0

FV = leave this as zero although it is the value that the solver computes = 0

P/Y = number of payments per year for quarterly = 4

C/Y = number of compounding periods per year for quarterly = 4

PMT: **END** **BEGIN** (highlight END since determining value at end)

Enter values in the TVM Solver screen.

```
N=20
I%=7.5
PV=-4000
PMT=0
FV=
P/Y=4
C/Y=4
PMT: END BEGIN
```

Highlight the zero after the FV =. Press ALPHA ENTER. The future value will now show up after FV =.

```
N=20
I%=7.5
PV=-4000
PMT=0
FV= 5799.79
P/Y=4
C/Y=4
PMT: END BEGIN
```

Sample Problem 2

Tomas is purchasing a new truck for \$28,000. He will receive a trade-in of \$2,000 on his old vehicle. He is financing the remainder of the purchase price at 7.75% for 5 years. What will be his monthly payment?

$$N = 12 \cdot 5 = 60$$

I% = interest rate left in percent form = 7.75

PV = present value is positive because it goes to the buyer = 26000

PMT = leave this as zero although it is the value that the solver computes = 0

FV = future value will be zero when all payments are made = 0

P/Y = number of payments per year for monthly = 12

C/Y = number of compounding periods per year for monthly = 12

PMT: **END** **BEGIN** (highlight END since determining value at end)

Enter values in the TVM Solver screen.

```
N=60
I%=7.75
PV=26000
PMT=
FV=0
P/Y=12
C/Y=12
PMT: END BEGIN
```

Highlight the zero after the PMT =. Press ALPHA ENTER. The payment will now show up after PMT =.

```
N=60
I%=7.75
PV=26000
PMT= -524.08
FV=0
P/Y=12
C/Y=12
PMT: END BEGIN
```

Why is the payment value negative? It is money going out or cash outflow.

Exploring Savings and Loans Using Technology

Practice Problems

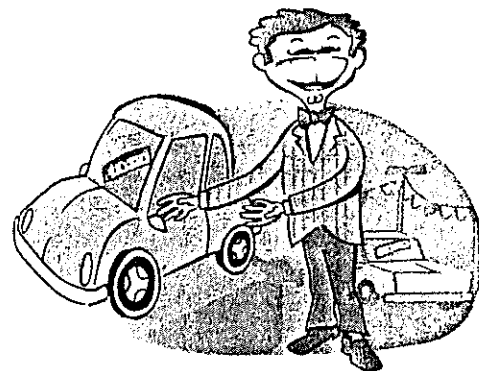
Use the Finance program (TVM Solver) on the graphing calculator to solve the following problems. Identify all variables entered into the calculator.

1. Jerry received a bonus at work of \$2,400. He decided to put it in a savings account at 4.25% interest compounded daily. What would be the value of the account in six years if no additional money was deposited or withdrawn?
2. Betty will be attending medical school after graduation from college in five years. She estimates that medical school will cost \$50,000. A local bank is offering a 60-month CD at a rate of 5.5% interest compounded monthly. Her parents have just received some inheritance money. How much of the inheritance money must her parents invest in the CD to accumulate \$50,000 at the end of the five years?
3. Ace Automotive is advertising 4.9% interest with no down payment on all "demo" cars. Richard selected a red SUV that cost \$23,250. If Richard financed the car for four years, what would be his monthly payments
4. Taylor wants to purchase a car that costs \$32,500. If he wants to finance the entire amount for no more than four years and have monthly payments no higher than \$700, what is the highest interest rate that he could accept?

Notes/Examples

Rolling on Down the Road KEY

Generally, when financing a loan for a larger amount of money such as an automobile, interest is compounded monthly based on a yearly interest rate as opposed to a simple interest rate. In the previous activity you have used the TVM Solver in the graphing calculator to determine monthly payments on financed automobiles using compounded interest. Although the monthly payments remain the same throughout the period of the loan, the amount of the payment applied toward interest and the amount applied toward the principal change. At the beginning of the loan, a greater amount is paid toward interest because you owe more. The process of computing the amount of interest and principal paid each month from the payment is called amortization.



Sample Problem 1

Genora purchased a used car for \$2,400 including tax, title, and license charges at 6% interest compounded monthly. She made monthly payments of \$206.56 for one year and paid off the loan. Construct an amortization schedule to show the amount of interest paid each month, the amount of principal paid on the loan, and the balance of the loan.

Payment Number	Interest Part	Principal Part	Balance
			\$2400
1	$2400(0.06 \div 12) = 12$	$206.56 - 12 = 194.56$	$2400 - 194.56 = 2205.44$
2	$2205.44(0.06 \div 12) = 11.03$	$206.56 - 11.03 = 195.53$	$2205.44 - 195.53 = 2009.91$
3	$2009.91(0.06 \div 12) = 10.05$	$206.56 - 10.05 = 196.51$	$2009.91 - 196.51 = 1813.40$
4	$1813.40(0.06 \div 12) = 9.07$	$206.56 - 9.07 = 197.49$	$1813.40 - 197.49 = 1615.91$
5	$1615.91(0.06 \div 12) = 8.08$	$206.56 - 8.08 = 198.48$	$1615.91 - 198.48 = 1417.43$
6	$1417.43(0.06 \div 12) = 7.09$	$206.56 - 7.09 = 199.47$	$1417.43 - 199.47 = 1217.96$
7	$1217.96(0.06 \div 12) = 6.09$	$206.56 - 6.09 = 200.47$	$1217.96 - 200.47 = 1017.49$
8	$1017.49(0.06 \div 12) = 5.09$	$206.56 - 5.09 = 201.47$	$1017.49 - 201.47 = 816.02$
9	$816.02(0.06 \div 12) = 4.08$	$206.56 - 4.08 = 202.48$	$816.02 - 202.48 = 613.54$
10	$613.54(0.06 \div 12) = 3.07$	$206.56 - 3.07 = 203.49$	$613.54 - 203.49 = 410.05$
11	$410.05(0.06 \div 12) = 2.05$	$206.56 - 2.05 = 204.51$	$410.05 - 204.51 = 205.54$
12	$205.54(0.06 \div 12) = 1.03$	$206.56 - 1.03 = 205.53$	Final payment of 206.57
Total	78.73	2399.99 + one extra cent on the final payment = 2400	

1. What is the total amount paid for the car? $2400 + 78.73 = \$2478.73$
2. In the table, what can you observe about the interest part? The interest paid out of the monthly payment decreases over the loan period.
3. In the table what can you observe about the principal part? The principal paid out of the monthly payment increases over the loan period.

Notes / Examples

Rolling on Down the Road KEY

4. Why does the final payment have to include an additional cent? Due to rounding, the final principal amount is not enough to cover what is owed in the last payment. Therefore an extra cent must be added to the payment.

Besides using the TVM Solver, monthly payments can also be calculated using a formula model.

Amortization Formula for Monthly Payment

$$M = P \cdot \frac{\frac{r}{n}}{1 - \frac{1}{\left(1 + \frac{r}{n}\right)^{nt}}}$$

M = monthly payment (amortized)

P = amount of loan (principal)

r = interest rate per year

n = number of pay periods per year

t = number of years

Sample Problem 2

Use the formula to calculate the monthly payment for the loan Genora took out to purchase the used car for \$2,400 including tax, title, and license charges at 6% interest compounded monthly. How does it compare with the monthly payment given in the problem?

$$M = 2400 \cdot \frac{\frac{0.06}{12}}{1 - \frac{1}{\left(1 + \frac{0.06}{12}\right)^{12 \cdot 1}}}$$

Enter into the calculator.

$$M = 2400 \left(\frac{.06/12}{1 - (1/(1 + (.06/12))^{12 \cdot 1})} \right) = \$206.56$$

The monthly payment calculated by the formula is the same as the one in the problem.

Rolling on Down the Road



Practice Problems

Purchasing a Car

1. Ms. Salinas is purchasing a new car from Courtesy Motors. The cost of the car she has decided to buy is \$24,500. The sales tax on automobiles is 3.25%. The title and license charges are \$120. She is financing the purchase through her bank which requires 10% down on the total costs of the car. The loan will be at an interest rate of 7.75% compounded monthly. She wants to pay the car off in three years.
 - a. What is the total cost of purchasing the new car?

 - b. What is the amount of the down payment?

 - c. What will be the loan amount?

 - d. Calculate her monthly payment using the Amortization Formula for Monthly Payment.

 - e. Enter the data in the TVM Solver in the graphing calculator to verify the monthly payment. What values were entered for each variable?



Rolling on Down the Road

Leasing a Car

2. Ms. Salinas also has the option to lease the car. The car salesperson has explained that a lease is an agreement in which she must make equal monthly payments for a specific period of time. At the end of the lease, she will not own the car but must return it to the dealership. At the end of lease there will be an option to purchase the car at a predetermined price. It is possible that end-of-lease fees and charges for excess mileage will be assessed at the end of the lease period.

<p style="text-align: center;">Lease Terms \$275 per month for 36 months \$2,500 at signing plus tax, title, and license fees</p>

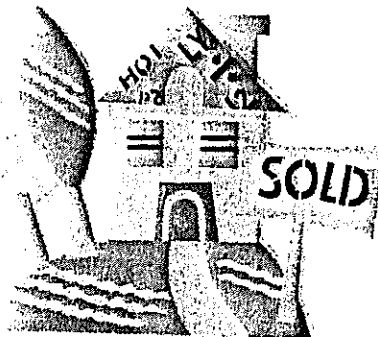
Although the monthly payment on the lease is much cheaper than the loan purchase monthly payment, Ms. Salinas decides to investigate further.

- a. What is the total amount Ms. Salinas will pay to purchase the car? (Remember not to forget the down payment.)
- b. If the car purchased depreciates \$1,650 per year, what is the value of the car at the end of the loan?
- c. What was the loss on the car?
- d. What is the total cost of leasing the car?
- e. What is the loss on leasing the car?
- f. From Ms. Salinas' investigations, do you think she will decide it is better to purchase or lease the car? Explain your reasoning.

Notes/Examples

Home Sweet Home KEY

The largest purchase most people will make during their lifetime will be the purchase of a house. Once the house is selected and the price is agreed upon, a lender must be found to finance the loan for the house. A mortgage is a loan that is specifically for purchasing a house. The mortgage will not only include the cost of the house, but also closing costs such as attorney fees, taxes, administration fees, appraisals, points, and other costs that are added at closing.



The type of house you can buy depends on monthly income and amount of down payment. Down payments usually range from 5% to 20% of the selling price of the house. If the down payment is less than 20%, the home buyer will have to pay Private Mortgage Insurance (PMI) with each monthly payment. This insurance protects the lender by guaranteeing that, in the event of a default, the insurer will pay the mortgage.

A mortgage is an amortized loan. Amortization tables are used by banks and real estate agents to determine monthly mortgage payments on various rates and periods of home loans.

Interest Rate	10 Years	15 Years	20 Years	25 Years	30 Years
5.0%	10.61	7.91	6.60	5.85	5.37
5.5%	10.85	8.17	6.88	6.14	5.68
6.0%	11.10	8.44	7.16	6.44	6.00
6.5%	11.35	8.71	7.46	6.75	6.32
7.0%	11.61	8.99	7.75	7.07	6.65
7.5%	11.87	9.27	8.06	7.39	6.99
8.0%	12.13	9.56	8.36	7.72	7.34
8.5%	12.40	9.85	8.68	8.05	7.69
9.0%	12.67	10.14	9.00	8.39	8.05

Sample Problem 1

The Millhouse family is purchasing a new home. They have a combined net monthly income of \$4,500. Their combined monthly bills total \$1,235. They would like to keep \$2,000 back for charitable donations and savings. What amount would be left to pay the mortgage on the new home?

$$4500 - (1235 + 2000) = \$1,265$$

The Millhouse family will take out a loan of \$140,000. The interest rate on the loan will be 7.5%. What would be least amount of years they could take out the home loan and still keep the payment under \$1,265? What would be the monthly payment?

$$10 \text{ years: } \frac{140000}{1000} \cdot 11.87 = \$1,661.80 \quad \text{Too much}$$

$$15 \text{ years: } \frac{140000}{1000} \cdot 9.27 = \$1,297.8 \quad \text{Too much}$$

$$20 \text{ years: } \frac{140000}{1000} \cdot 8.06 = \$1,128.40 \quad \text{Twenty year mortgage with a monthly payment of } \$1,128.40$$

Notes/Examples

Home Sweet Home KEY

To qualify for a mortgage, the monthly housing expense should be no more than 28% of the monthly gross income. Will the Millhouse family qualify for the loan with this monthly payment?

$$4500(0.28) = 1260 \text{ Yes, the monthly payment would just need to be less than } \$1,260.$$

Sample Problem 2

The Kelton's can afford a maximum monthly payment of \$850. They will finance the house over 30 years at an interest rate of 8%. What is the maximum loan that the Kelton's can seek?

$$\frac{850}{7.34} \cdot 1000 = \$115,803.81$$

In order to keep the monthly payment at or below \$850, they will need to take a mortgage of no more than \$115,803.81 over 30 years at an interest rate of 8%.

Sample Problem 3

Christina is purchasing her first home. She has offered \$125,000 for the house, and it has been accepted. Her closing costs will total \$3,245. She will make a down payment of \$17,000 and finance the rest of the costs over 25 years at an interest rate of 7%. What are the total costs of the house? What amount will be financed? What will be the monthly payments? Verify the monthly payment using the TVM Solver.

$$\text{Total Costs: } 125000 + 3245 = \$128,245$$

$$\text{Amount financed: } 128245 - 17000 = \$111,245$$

$$\text{Monthly payments: } \frac{111,245}{1000} \cdot 7.07 = \$786.50$$

TVM Solver gives a monthly payment of \$786.26. The difference of 24¢ is probably due to rounding off in the table.

It is common for mortgage payments to include monthly costs of property taxes and homeowner insurance.

The property taxes on Christina's new home are \$3,236 per year and the homeowner insurance for the property is \$950 per year. What would be Christina's total monthly payment, if these annual fees were included in monthly increments into her mortgage payment?

$$\text{Total monthly payment: } 786.50 + \frac{3236}{12} + \frac{950}{12} = \$1,135.33$$

Home Sweet Home

Practice Problems

1. A house is purchased for \$145,000 including closing costs. A down payment of \$10,000 is applied. The mortgage will be over 20 years at an interest rate of 6.5%.
 - a. What will be the financed amount?
 - b. Use the Amortization Table on p. 1 to determine the monthly payment. Verify the monthly payment using the TVM Solver.
 - c. Complete an amortization schedule to determine the amount of interest and principal paid on the first two payments.

Payment	Interest Part	Principal Part	Balance
			135,000
1			
2			

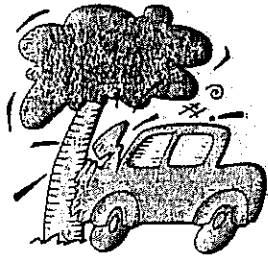
2. Complete the table below to investigate the options of financing a \$115,000 mortgage at 7%.

Time of Loan	Monthly payment \$	Total amount paid \$	Interest paid \$
10 years			
15 years			
20 years			
25 years			
30 years			

- a. What are the benefits of taking out a mortgage over a longer time period?
 - b. What are the disadvantages of taking out a mortgage over a longer time period?
 - c. How much more interest is paid by taking the mortgage out for 30 years as opposed to 15 years?
3. Alex and Alicia have a combined gross monthly income of \$5,100. They have found their dream home and have agreed to a selling price of \$176,500. The closing costs are \$4,100. Alex and Alicia have saved \$20,000 to use as a down payment. The best interest rate they have been able to find is 7.5%.
 - a. What amount would need to be mortgaged?
 - b. Alex wanted to pay the mortgage off in 15 years to save on the amount of interest they would pay. Would the mortgage company qualify this loan?
 - c. What is the minimum number of years according to the Amortization Table that Alex could take out the mortgage?
 - d. How much money would Alex and Alicia have saved, if they could have qualified for the 15-year mortgage?

Notes/Examples

Ins and Outs of Insurance KEY



Insurance is a way to deal with severe financial loss by pooling the risk over a large number of people. Insurance payments are pooled and used to provide funds to those who have purchased the insurance and experienced a loss. Therefore, the more people that purchase insurance for the same type of loss, the lower the insurance rates. Other things that will affect rates involve increased risk to the insurance company such as age of drivers, security

features, construction materials for a house, health of persons insured, etc. Homeowner and automobile insurance are both required by lenders for the period of the loan to protect the lender from catastrophic losses. However, automobile insurance is not incorporated into the monthly payment like is common with homeowner insurance.



An insurance policy defines the exact coverage and limitations. Amounts specified in the insurance policy are called the face value of the policy. The premium is the amount paid to receive the coverage defined in the insurance policy. The money paid to the insured party by the insurer when a loss occurs is called the indemnity. Insurance requirements are specified by state commissions and therefore vary from state to state.

Texas law requires all drivers to be insured. The minimum coverage required by law is 20/40/15 coverage. This means \$20,000 bodily injury per person, \$40,000 bodily injury per accident, and \$15,000 property damage per accident. Liability insurance pays for the other vehicle. It will not pay for your own vehicle. The table below shows sample of possible base annual premiums for various coverage options. The territories commonly define where the insured lives such as urban, suburban, rural, etc. Both "Bodily Injury" and "Property Damage" liability insurance must be purchased in the state of Texas.

Base Annual Premium for Automobile Liability (Bodily Injury)			
Bodily Injury Coverage	Territory A	Territory B	Territory C
*20/40	\$88	\$98	\$123
25/40	\$90	\$101	\$128
25/50	\$93	\$105	\$133
50/50	\$95	\$109	\$136
50/100	\$98	\$111	\$139
100/100	\$100	\$116	\$140
100/200	\$103	\$118	\$144
Base Annual Premium for Automobile Liability (Property Damage)			
Property Coverage	Territory A	Territory B	Territory C
*15,000	\$84	\$98	\$103
25,000	\$86	\$101	\$108
40,000	\$88	\$103	\$113
50,000	\$91	\$106	\$116
100,000	\$93	\$110	\$119

Minimum liability insurance required for Texas

Notes / Examples

Ins and Outs of Insurance KEY

Persons at higher risk will be required to pay above the base amount. The table below gives the factors by which the base amount will be multiplied depending on age of driver and distances driven.

Automobile Premium Multiples by Risk Factors					
Type/Age of Drivers		One way trip to work < 3 mi.	One way trip to work 3 < mi. < 9	One way trip to work 10+ mi.	Business vehicle
Young Female	Age 16	1.41	1.51	1.81	1.91
	Age 20	1.06	1.16	1.46	1.56
Young Male (married)	Age 16	1.61	1.71	2.02	2.10
	Age 20	1.46	1.56	1.86	1.96
	Age 21	1.41	1.52	1.82	1.92
	Age 24	1.11	1.22	1.52	1.61
Young Male (unmarried not principal owner of vehicle)	Age 16	2.05	2.17	2.45	2.55
	Age 20	1.61	1.71	2.00	2.12
	Age 21	1.56	1.66	1.98	2.04
	Age 24	1.11	1.22	1.48	1.61
Young Male (unmarried and owner of vehicle)	Age 16	2.70	2.82	3.12	3.20
	Age 20	2.55	2.66	2.99	3.05
	Age 21	2.52	2.61	2.93	3.00
	Age 24	1.92	2.02	2.32	2.42
	Age 26	1.56	1.61	1.92	2.02
	Age 29	1.12	1.22	1.55	1.62
Mature adults	All other ages	1.00	1.10	1.38	1.51

Sample Problem 1

James is a married 21 year old male that lives in Territory B. He drives 12 miles one way to work.

- a. What does 25/50/25 mean? Coverage of \$25,000 bodily injury per person, \$50,000 bodily injury per accident, \$25,000 property damage per accident
- b. Determine the annual premium of 25/50/25 liability insurance using the three tables.
 Bodily Injury 25/50 Territory B = \$105
 Property Damage 25 Territory B = \$101
 Multiple factor for 21-year old married male 12 mi to work = 1.82
 $(105 + 101)(1.82) = \$374.92$
- c. If James still lives and works in the same places when he turns 25, how much will he save on liability insurance each year? $\$374.92 - \$284.28 = 90.64$

Sample Problem 2 (Use previous information for James from Sample Problem 1, as necessary.)

James ran a stop sign and struck another motorist causing \$28,000 in property damage. The motorist and her passenger also sued for \$45,000 each in bodily injury. The judge awarded the motorist \$26,000, but he only awarded the passenger \$10,000 in bodily injury.

- a. How much will the insurance agency pay?
 Property damage: \$25,000 Personal injury: \$25,000 (motorist) and \$10,000 passenger
 Total of \$60,000
- b. How much will be James responsibility?
 Property damage: \$3,000 Personal injury: \$1,000 (motorist) and \$0 passenger
 Total of \$4,000

Notes/Examples

Ins and Outs of Insurance KEY

Two other types of automobile insurance are comprehensive and collision. Comprehensive insurance covers the insured automobile from fire, theft, vandalism, etc. Collision insurance pays for damages to the insured's vehicle when the insured is either at fault or those at fault do not cover the damages. The rates for each of these types of insurance are affected by type and age of vehicles. Uninsured motorist insurance is also available to cover bodily injury that occurs in an accident where the other driver is not insured.

In the table below, the letters indicate the model of car with less expensive cars corresponding to the beginning letters of the alphabet. As in liability insurance, these premiums must also be multiplied by the Automobile Premium Multiples by Risk Factors.

Base Annual Premium for Automobile Comprehensive and Collision				
Car Model	Age of Car Years	Comprehensive	\$250 Deductible Collision	\$500 Deductible Collision
A – G	1	58	85	78
	2, 3	55	79	75
	4	50	75	69
H – K	1	64	113	105
	2, 3	60	106	99
	4	55	96	88
L – N	1	72	125	115
	2, 3	69	126	109
	4	59	105	96
O – Q	1	77	142	128
	2, 3	71	135	119
	4	65	120	109

Sample Problem 3

Stephen Waddell is 24 years old, unmarried, and lives in Territory C. He owns his own vehicle, which he uses for business. His vehicle is a 2-year old truck that is considered a Model M automobile. Stephen is taking out 50/100/50 liability insurance coverage on his vehicle. He is also taking out full comprehensive insurance coverage and \$500 deductible collision insurance coverage. Use the tables to calculate his total annual premium.

Bodily injury: \$139

Property damage: \$116

Comprehensive: \$69

Collision: \$109

Multiple: 2.42

$$(139 + 116 + 69 + 109)(2.42) = \$1,047.86$$

Stephen is at fault in an accident that causes \$2,500 damage to his vehicle and \$12,500 damage to the other vehicle. A court suit awards \$53,250 in bodily injury damages to the other motorist.

a. How much will the insurance agency pay?

$$50000 \text{ (bodily injury)} + 12500 \text{ (property damage)} + 2000 \text{ (collision)} = \$64,500$$

b. How much will be James responsibility?

$$3,250 \text{ (coverage on bodily injury)} + 500 \text{ (deductible)} = \$3,750$$

Ins and Outs of Insurance



Practice Problems

1. Susie is 30 years old and drives 12 miles to work one way. She lives in Territory A. What will it cost her per year to purchase 50/50/25 liability coverage, full comprehensive, and \$250 deductible collision on a 1 year old Model C automobile?

2. Abraham and his twin sister Anna just turned sixteen and their parents purchased each of them a 4 year old model H car for their birthdays. They live in Territory C and will drive two miles one way to school each day. Since Abraham and his twin sister, Anna, will be the principal drivers of the cars, their parents are going to insure each car with the minimum liability coverage for Texas, full comprehensive, and \$500 deductible collision.
 - a. What will be the annual insurance premium for each teenager?

 - b. How much more will their parents have to pay to insure Abraham?

3. Hillary Glover was at fault in an accident in which two people were injured. She was insured with 50/100/25 liability and \$250 deductible collision insurance. The property damage to the other vehicle was \$4,800. The property damage to Hillary's car was \$6,500. The court awarded one of the injured people \$30,000 and the other person \$60,000.
 - a. How much will the insurance company pay?

 - b. How much will be the responsibility of Hillary?

Notes

Formulas and Tables for Computing Personal Finance

Formulas

Simple Interest
 $I = Prt$

Maturity Value
 $M = P + I$

Compound Interest
 $A = P\left(1 + \frac{r}{n}\right)^{nt}$

The TVM Solver in the graphing calculator can also be used to calculate compound interest.

Income Tax

Tax Rate	Single	Married Filing Jointly or Qualified Widow(er)	Married Filing Separately	Head of Household
10%	\$0 – \$8,025	\$0 – \$16,050	\$0 – \$8,025	\$0 – \$11,450
15%	\$8,026 – \$32,550	\$16,051 – \$65,100	\$8,026 – \$32,550	\$11,451 – \$43,650
25%	\$32,551 – \$78,850	\$65,101 – \$131,450	\$32,551 – \$65,725	\$43,651 – \$112,650
28%	\$78,851 – \$164,550	\$131,451 – \$200,300	\$65,726 – \$100,150	\$112,651 – \$182,400
33%	\$164,551 – \$357,700	\$200,301 – \$357,700	\$100,151 – \$178,850	\$182,401 – \$357,700
35%	\$357,701+	\$357,701+	\$178,851+	\$357,701+

Home Mortgage Amortization Table

Amortization Table: Monthly Cost to Finance \$1,000					
Interest Rate	10 Years	15 Years	20 Years	25 Years	30 Years
5.0%	10.61	7.91	6.60	5.85	5.37
5.5%	10.85	8.17	6.88	6.14	5.68
6.0%	11.10	8.44	7.16	6.44	6.00
6.5%	11.35	8.71	7.46	6.75	6.32
7.0%	11.61	8.99	7.75	7.07	6.65
7.5%	11.87	9.27	8.06	7.39	6.99
8.0%	12.13	9.56	8.36	7.72	7.34
8.5%	12.40	9.85	8.68	8.05	7.69
9.0%	12.67	10.14	9.00	8.39	8.05

Notes

Formulas and Tables for Computing Personal Finance

Liability Insurance Tables

Base Annual Premium for Automobile Liability (Bodily Injury)			
Bodily Injury Coverage	Territory A	Territory B	Territory C
*20/40	\$88	\$98	\$123
25/40	\$90	\$101	\$128
25/50	\$93	\$105	\$133
50/50	\$95	\$109	\$136
50/100	\$98	\$111	\$139
100/100	\$100	\$116	\$140
100/200	\$103	\$118	\$144

Base Annual Premium for Automobile Liability (Property Damage)			
Property Coverage	Territory A	Territory B	Territory C
*15,000	\$84	\$98	\$103
25,000	\$86	\$101	\$108
40,000	\$88	\$103	\$113
50,000	\$91	\$106	\$116
100,000	\$93	\$110	\$119

Multipliers for Risk Factors

Automobile Premium Multiples by Risk Factors					
Type/Age of Drivers		One way trip to work < 3 mi.	One way trip to work 3< mi.<9	One way trip to work 10+ mi.	Business vehicle
Young Female	Age 16	1.41	1.51	1.81	1.91
	Age 20	1.06	1.16	1.46	1.56
Young Male (married)	Age 16	1.61	1.71	2.02	2.10
	Age 20	1.46	1.56	1.86	1.96
	Age 21	1.41	1.52	1.82	1.92
Young Male (unmarried not principal owner of vehicle)	Age 24	1.11	1.22	1.52	1.61
	Age 16	2.05	2.17	2.45	2.55
	Age 20	1.61	1.71	2.00	2.12
	Age 21	1.56	1.66	1.98	2.04
Young Male (unmarried and owner of vehicle)	Age 24	1.11	1.22	1.48	1.61
	Age 16	2.70	2.82	3.12	3.20
	Age 20	2.55	2.66	2.99	3.05
	Age 21	2.52	2.61	2.93	3.00
	Age 24	1.92	2.02	2.32	2.42
Mature adults	Age 26	1.56	1.61	1.92	2.02
	Age 29	1.12	1.22	1.55	1.62
Mature adults	All other ages	1.00	1.10	1.38	1.51

Notes

Formulas and Tables for Computing Personal Finance

Comprehensive and Collision Insurance Tables

Base Annual Premium for Automobile Comprehensive and Collision				
Car Model	Age of Car Years	Comprehensive	\$250 Deductible Collision	\$500 Deductible Collision
A – G	1	58	85	78
	2, 3	55	79	75
	4	50	75	69
H – K	1	64	113	105
	2, 3	60	106	99
	4	55	96	88
L – N	1	72	125	115
	2, 3	69	126	109
	4	59	105	96
O – Q	1	77	142	128
	2, 3	71	135	119
	4	65	120	109

