

Business Math: A Pedagogical Odyssey

Steven J. Wilson
ColoMATYC, Mar. 2011
Pueblo, Colorado

Today's Outline

- Philosophies and Books
- Calculators and TVM Problems
- Spreadsheets
- The Main Idea: Percents
- Online Homework
- The Future?

Two Common Book Types

- **Arithmetic-based:** review and applications of arithmetic, emphasis on drill and process, some topics only lightly covered
- **Algebra-based:** introduction to algebra, emphasis on formulas and equations



Chapters of an Algebra-Based Book

• Fractions	• Simple interest
• Equations & Formulas	• Notes & discount
• Percents	• Compound interest
• Banking (checking)	• Annuities & sinking funds
• Payroll	• Loans
• Taxes	• Depreciation
• Risk (insurance)	• Financial statements
• Math of buying	• Securities
• Markup	• Business statistics
• Markdown, Inventory	

Philosophy of the JCCC Business Math Course

- Fundamentals of Math is a prerequisite
- Algebra is not a prerequisite
- Algebra is not an objective
- Uses technology
- Problem solving emphasis

Compound Interest & Annuities (Time Value of Money)

- **Formulas:** $A = \left[P + \frac{M(1+R)^N}{R} \right] [1 - (1+R)^{-N}] - P$
- **Tables:** 
- **Financial calculators:** 

Loan Payments

- \$18,000 loan, 4 years, 9% APR. Find the monthly payment.
- $N = 4 \times 12 = 48$
- $I/Y = 9$
- $P/Y = 12$
- $PV = 18000$
- $PMT = -447.93$
- $FV = 0$

Savings

- \$2,000 becomes \$9,500 in 5 years with \$100 monthly deposits and compounding. Rate?
- $N = 5 \times 12 = 60$
- $I/Y = 5.44\%$
- $P/Y = 12$
- $PV = 2000$
- $PMT = +100$
- $FV = 9500$

Spreadsheets: Construction vs. Implications


Construction	Implications
<ul style="list-style-type: none"> • Software training • Build formulas • Data entry • Analyze results 	<ul style="list-style-type: none"> • Data entry • Analyze results

Spreadsheet Examples

- **Payroll:** student analyzes implications of withholding for FICA and income taxes
- **Profitability:** student tries to maximize profit given costs and unknown built-in demand
- **Depreciation:** student explores results of different depreciation methods

Spreadsheet Examples

- **U.S. Rule:** student processes payments that vary in time and amount
- **Time Value of Money:** student obtains schedules showing the effect of a constant payment on a loan or for savings



JOHNSON COUNTY COMMUNITY COLLEGE
PAYROLL RECORD - 2006

For instructional purposes only

Marital status: Single
Allowances: 4
Hourly Wage: \$9.75
Your name: Steve

	Regular	Overtime	Gross	Cumulative	FWT	SWT	OASDI	Medicare	Total Tax	Net
Carried Forward	1040	250	\$13,796.25	\$13,796.25	\$697.32	\$280.80	\$656.37	\$200.05	\$2,033.54	\$11,762.71
7-Jul	40		\$390.00	\$14,186.25	\$0.52	\$5.56	\$24.18	\$5.56	\$43.52	\$346.00
14-Jul	40	8	\$507.00	\$14,693.25	\$23.27	\$9.66	\$31.43	\$7.35	\$71.71	\$436.29
21-Jul	40	3	\$433.88	\$15,127.13	\$12.50	\$7.10	\$36.30	\$6.29	\$53.19	\$380.69
28-Jul	32		\$312.00	\$15,439.13	\$0.72	\$2.80	\$19.34	\$4.52	\$27.41	\$284.59
4-Aug	40	5	\$463.13	\$15,902.25	\$16.69	\$8.12	\$38.71	\$6.72	\$60.24	\$402.89
11-Aug	40	2	\$419.25	\$16,321.50	\$11.44	\$5.58	\$25.99	\$5.06	\$50.10	\$369.15
18-Aug	40		\$390.00	\$16,711.50	\$0.52	\$5.56	\$24.18	\$5.56	\$43.52	\$346.00
25-Aug	24		\$234.00	\$16,945.50	\$0.00	\$0.10	\$14.51	\$3.39	\$18.00	\$216.00
1-Sep	40	5	\$463.13	\$17,408.63	\$16.69	\$8.12	\$38.71	\$6.72	\$60.24	\$402.89
8-Sep	32		\$312.00	\$17,720.63	\$0.72	\$2.83	\$19.34	\$4.52	\$27.41	\$284.59
15-Sep	40	4	\$448.50	\$18,169.13	\$14.50	\$7.61	\$27.81	\$6.50	\$56.42	\$392.09
22-Sep	40	5	\$463.13	\$18,632.25	\$16.69	\$8.12	\$38.71	\$6.72	\$60.24	\$402.89
29-Sep	40		\$390.00	\$19,022.25	\$0.52	\$5.56	\$24.18	\$5.56	\$43.52	\$346.00
Totals	1528	282	\$19,022.25	\$19,022.25	\$836.50	\$368.56	\$1,179.36	\$275.84	\$2,650.26	\$16,371.99

JOHNSON COUNTY COMMUNITY COLLEGE For instructional purposes only
PROFITABILITY

Your name: Steve

Quantity purchased: 100
 List price (each): \$69.95
 Shipping charge: \$75.00
 Trade Discount: 70.00%
 Cash Discount: 2.00%

Shrinkage: 4.00%
 Op. expenses: 65.00% as percent of net cost

Net cost (total): \$1,037.53
 Net cost (each): \$18.38
 Adjusted net cost (each): \$19.14
 Break-even (each): \$31.58

	1st PRICE	2nd PRICE	3rd PRICE	4th PRICE	AVGS/TOTALS
Quantity to sell:	96	72	46	24	
Percent price change:	75.00%	25.00%	45.00%	65.00%	
Type of change:	markup-selling	markdown-total	markdown-total	markdown-total	
Selling Price (each):	\$76.86	\$67.42	\$42.11	\$36.80	\$53.86
Potential Profit (each):	\$44.96	\$25.84	\$10.53	(\$4.78)	
Net Profit Ratio:	58.75%	81.82%	33.34%	-15.14%	34.54%
Number sold:	24	26	22	14	86
Sales (total):	\$1,837.44	\$1,692.92	\$926.42	\$375.20	\$4,631.98
Gross Profit (total):					\$2,794.45
Net Profit (total):					\$1,620.06

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DEPRECIATION

Your name: Steve

Type: 200%-Declining
 Part-year: Half-Year
 Service date: 3/5/2006
 Lifetime (years): 15
 Cost basis: \$50,000.00
 Scrap value: \$4,000.00

Number	Year	Current Depreciation	Accumulated Depreciation	Book Value
				\$50,000.00
1	2006	\$3,333.33	\$3,333.33	\$46,666.67
2	2007	\$6,222.22	\$9,555.56	\$40,444.44
3	2008	\$5,392.59	\$14,948.15	\$35,051.85
4	2009	\$4,673.58	\$19,621.73	\$30,378.27
5	2010	\$4,050.44	\$23,672.16	\$26,327.84
6	2011	\$3,510.38	\$27,182.54	\$22,817.46
7	2012	\$3,042.33	\$30,224.87	\$19,775.13
8	2013	\$2,636.68	\$32,861.55	\$17,138.45
9	2014	\$2,285.13	\$35,146.68	\$14,853.32
10	2015	\$1,980.44	\$37,127.12	\$12,872.88
11	2016	\$1,716.38	\$38,843.51	\$11,156.49
12	2017	\$1,487.53	\$40,331.04	\$9,668.96
13	2018	\$1,289.19	\$41,620.23	\$8,379.77
14	2019	\$1,117.29	\$42,737.54	\$7,262.46

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U.S. RULE

Your name: Steve

Loan amount: \$50,000.00
 Loan date: 3/5/2006
 Annual interest rate: 8.50%
 Exact or ordinary: Exact

Number	Date	Principal	Payment	Interest	Applied to Balance	Balance	Payoff Amount
	3/5/2006					\$50,000.00	
1	4/19/2006	\$9,000.00	\$5,000.00	\$523.97	\$4,476.03	\$45,523.97	\$50,523.97
2	5/6/2006	\$4,523.97	\$4,000.00	\$180.23	\$3,819.77	\$41,704.20	\$45,704.20
3	8/31/2006	\$41,704.20	\$2,500.00	\$1,136.30	\$1,363.70	\$40,340.50	\$42,840.50
4	9/25/2006	\$40,340.50	\$300.00	\$234.66	\$65.14	\$40,275.36	\$40,575.36
5							
6							
7							
8							
9							
10							

JOHNSON COUNTY COMMUNITY COLLEGE For instructional purposes only
TIME VALUE OF MONEY

Your name: Steve

Payment type: Loan Payments
 Ordinary or Beginning: Ordinary
 Number periods per year: 12

DATA ENTRY **RESULTS**

Leave blank the data entry cell you wish to find.

Number of periods:	180	6.75%	180
Annual interest rate:	6.75%	\$120,000.00	\$120,000.00
Present Value:	\$120,000.00		\$120,000.00
Periodic Payment:			-\$1,061.89
Future value:	\$0.00		\$0.00

Period	Payment	Interest	Balance
0			\$120,000.00
1	-\$1,061.89	\$675.00	\$119,613.11
2	-\$1,061.89	\$672.82	\$119,224.04
3	-\$1,061.89	\$670.64	\$118,832.79
4	-\$1,061.89	\$668.43	\$118,439.33
5	-\$1,061.89	\$666.22	\$118,043.66
6	-\$1,061.89	\$664.00	\$117,645.77
7	-\$1,061.89	\$661.76	\$117,245.64
8	-\$1,061.89	\$659.51	\$116,843.26
9	-\$1,061.89	\$657.24	\$116,438.61
10	-\$1,061.89	\$654.97	\$116,031.69

Unhappy with Current Books ...

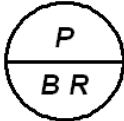
- No expectation of technology use
- Algebra formulas in a non-algebraic course
- Multiple chapters for single concepts
- Lack of a mathematical theme

A New Book Type

The Main Idea: Percents

- **Payroll:** gross pay, payroll taxes, net pay, effective tax rates
- **Retailing:** discounts, markups, markdowns, shrinkage, profitability, income statements
- **Asset Values:** inventory, depreciation, balance sheets, stocks
- **Finance:** simple interest, compound interest, annuities, savings, loans, bonds

Approaches to Basic Percents

- Algebra: $P = B \times R$
- Proportion: $\frac{R}{100} = \frac{P}{B}$
- PBR diagram: 

Approaches to Percent Change

- Algebra: $P = B \times (1 \pm R)$
- Proportion: $\frac{100 \pm R}{100} = \frac{P}{B}$
- Percent change diagram:

_____ %	Old	\$ _____
_____ %	\pm Change	\$ _____
_____ %	New	\$ _____

Percent Change Diagram

- After a 15% decrease, the price will be \$79. Original price?

100%	Old	\$ 92.94
<u>15%</u>	- Change	\$ 13.94
85%	New	\$ 79.00

Markup on Selling Price

- A 40% markup on selling price on an item that cost \$175. Find the selling price.

60%	Cost	\$ 175.00
<u>40%</u>	+ Markup	\$ 116.67
100%	Selling	\$ 291.67

Adjusting for Shrinkage (with a markup on selling price)

- Dealer cost is \$80 with 5% shrinkage. Find the adjusted cost.

95%	Cost	\$ 80.00
<u>5%</u>	+ Markup	\$ 4.21
100%	S (adj cost)	\$ 84.21


Simple Interest

- After 3 years at 4% simple interest, the account holds \$500. Original balance?

100%	Old	\$ 446.43
$3 \times 4 = 12\%$	+ Change	\$ 53.57
112%	New	\$ 500.00

Online Homework

- Used WebCT & Angel (adopted by college)
- Developed own question bank
- Algorithmically-generated questions
- Five questions per section
- Most questions tolerate one-cent errors
- Unlimited practice for mastery & grade



HW 6.2

Steven Wilson
 Started: September 19, 2006 6:51 PM
 Questions: 5

Time: 18:52:13
 Allowed: ---:---:---
 Remaining: ---:---:---

Question Status
 0 Unanswered
 0 Answer not saved
 5 Answered

1. (Points: 1)
 Find the simple interest rate paid if a deposit of \$5,255 earned \$579 in 3 years. (Use percent form with two decimal places in your answer.)
 Answer:
 Save Answer

2. (Points: 1)
 Find the number of years needed for an investment of \$5,733.15 to earn \$998.91 interest if 4.51% simple interest is paid. (Use two decimal places in your answer.)
 Answer:
 Save Answer

3. (Points: 1)
 A deposit was made into a savings account which pays 4.80% simple exact

MATH-120-350-12544

Course Calendar Lessons Resources Communicate Report

Home > Course > Lessons > Chapter 6 > HW 6.2

HW 6.2
 Value: 5 points. Unlimited attempts available.

My Notes | Print | Previous | Next

Homework, Section 6.2

1. Find the simple interest rate paid if a deposit of \$3102 earned \$475 in 4 years. (Use percent form with two decimal places in your answer.)
 Units:

2. A deposit was made into a savings account which pays 4.44% simple exact interest. After 6 years, \$418.79 interest was paid. What was the size of the deposit? (Give your answer to the nearest cent.)
 \$:

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HW 6.2

Description
 Due October 26, 2006.

Add to Assessment Create Questions

Move	Title	Points	Type
<input type="checkbox"/>	1. 6.2 Q20 Rate	1	Calculated
<input type="checkbox"/>	2. Question Set	Select: 1 x 1	Question Set
<input type="checkbox"/>	6.2 Q10 Principal	--	Calculated
<input type="checkbox"/>	6.2 Q30 Time	--	Calculated
<input type="checkbox"/>	3. 6.2 Q40 Principal - days	1	Calculated
<input type="checkbox"/>	4. 6.2 Q50 Time - days	1	Calculated
<input type="checkbox"/>	5. 6.2 Q60 Time - Doubling	1	Calculated
Total Points		5	Update Total

MATH-120-350-12544

Course Calendar Lessons Resources Communicate Report Automate Manage

Home > Course > Lessons > Chapter 6 > HW 6.2

HW 6.2
 Value: 5 points. Unlimited attempts available.

Settings Reports Utilities Delete Print My Notes | Previous | Next

Assessment Editor At a Glance

Add Question Set Preview Select an Action Drag 'n' drop enabled

Question Sets Questions
 Add Question Configure Select All Delete Question Set

Homework, Section 6.2

1. Algorithmic (1 points) Regrade Delete

2. 6.2 Q20a: Rate (1 points) Delete

6.2 Q10,30: P or T

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Edit Calculated Question

*Title: 6.2 Q20 Rate
 To indicate a variable, enter the variable name as specified in the formula in square brackets.
 Example: What is the sum of [x] and [y]?

Question text: HTML Creator On Off
 Find the simple interest rate paid if a deposit of \$[p] earned \$[i] in [t] years. (Use percent form with two decimal places in your answer.)

Image: Browse...

Sharing: This question is used in the following assessments:
 Final Review 6 , HW 6.2

Formula:
 Enclose variables in square brackets. Example: $[x] + [y]$. Values for variables will be inserted automatically. You can also use constants in place of variables.
[View a list of supported formulas.](#)
 $100 * [i] / ([p] * [t])$

Units:
 Required Ignore spaces Ignore case
 Percentage of the question value:

Variables:
i Minimum: Maximum: Calculate to decimal places
p Minimum: Maximum: Calculate to decimal places
t Minimum: Maximum: Calculate to decimal places

Answers
 Answer Set:
 Specify the number of answers per set
 Calculate the answer sets to Decimal
 Answer Tolerance (+/-): Units: Percent

	i	p	t	Answer
1	<input type="text" value="545"/>	<input type="text" value="5,968"/>	<input type="text" value="3"/>	3.04
2	<input type="text" value="420"/>	<input type="text" value="4,148"/>	<input type="text" value="4"/>	2.53
3	<input type="text" value="573"/>	<input type="text" value="3,554"/>	<input type="text" value="4"/>	4.03
4	<input type="text" value="342"/>	<input type="text" value="3,118"/>	<input type="text" value="5"/>	2.19
5	<input type="text" value="459"/>	<input type="text" value="3,013"/>	<input type="text" value="3"/>	5.08
6	<input type="text" value="366"/>	<input type="text" value="4,236"/>	<input type="text" value="5"/>	1.73

Algorithmic Question Editor
 Warning: At least one person has already viewed this question. If you make changes, only people who have not yet viewed this question will see your changes. Also, if changes are made, assessment and item analysis reports related to this question will be disabled.

Question Editor
 Question Type: Algorithmic
 Question Title:
 Points: 10% of this assessment's 5 points
 Question Text:
 Random Variables:

Variable	Type	Min	Max	Rounding	Decimal Places
$[i]$	Continuous Range	300	600	0	0
$[p]$	Continuous Range	3000	6000	0	0
$[t]$	Continuous Range	2	5	0	0

 Answer Variables:

Variable	Formula	Rounding
$[X]$	$100 * ([i] * [t]) / [p]$	0

Answer Boxes
 # Box Label(Optional) Display Units Box? Box Width Score
 1. % 1 of this question's 1 points
 new answer box(es)

Grading Rubrics
 Define the correct answer (X) for each Answer Box.
 Answer Feedback
 Use Same Rubric for All Answers
 Enter answers for answer box #1
 Answer a) Answer: Units: Case-sensitive? Score %: % of this box's 1 points
 Evaluate using: [Answer] - [0.01] ≤ [Answer] ≤ [Answer] + [0.01] %
 more answer(s)

Incorrect answer feedback **Correct answer feedback**
 Feedback:

First Name	HW 3.1	HW 3.2	HW 3.3	HW3
Alphanumeric	Quiz (out of 5)	Quiz (out of 5)	Quiz (out of 5)	Calculated (out of 25)
Jonathan				
Jeffrey				
Steven				
Demo	--	--	--	(0)
	5	5	5	25
	20	20	20	8
	3	4	3	15
	--	--	--	(0)
	5	5	5	23
	5	4	4	23
	--	--	--	(0)
	2	2	2	13
	4	5	5	19
	4	5	--	(10)
	4	5	5	(12)

0-350-12544

Calendar Lessons Resources Communicate Report Automate Manage

Course: Management Console > Gradebook > View Grades

Grades

Users: Number to Display: View: Default Points Percentage

	Overall	3.4 (5 pts.)	HW 3.1 (5 pts.)	HW 3.2 (5 pts.)	HW 3.3 (2009)	HW 3.4 (2009)	HW
Average	153 (45%)	4	4	4.63	3.95	4.05	3.8
	277 (81.47%)	5	5	5	5	5	5
	151 (44.41%)	5	5	4	5	4	5
	240 (70.59%)	5	4	4	4	4	5
	252 (74.12%)	5	5	5	5	5	5
	304 (89.41%)	5	5	4	4	4	4
	292 (85.88%)	5	5	5	5	5	5
	265 (77.94%)	5	5	4	5	4	4
	304.5 (88.26%)	5	5	5	5	5	3.5
	246 (72.35%)	5	5	5	5	5	4
	251 (73.62%)	5	5	3	4	4	5
	119.67 (35.2%)	5	5	5	4	4	2.67
	301 (84.79%)	5	5	3	4	4	3
	304 (89.41%)	5	5	4	4	4	5
	8 (2.35%)	3	0	0	0	0	0
	294 (82.62%)	5	5	5	4	4	4

Grade Out of 5	Attempt	Score Out of 5	Time
100	View Attempt 1	0	00:00:25
	View Attempt 2	5	00:08:32
100	View Attempt 1	3	00:03:56
100	View Attempt 1	3	00:19:53
100	View Attempt 1	5	00:11:43
14	View Attempt 1	1	00:10:38
	View Attempt 2	2	00:07:15
	View Attempt 3	3	00:09:16
	View Attempt 4	3	00:02:47
	View Attempt 5	1	00:03:26
	View Attempt 6	4	00:04:15
100	View Attempt 1	2	00:11:01
100	View Attempt 1	1	00:12:51
	View Attempt 2	3	00:06:01
	View Attempt 3	3	00:06:04
	View Attempt 4	3	00:05:53
	View Attempt 5	3	00:10:18
100	View Attempt 1	1	00:13:11

MATH-120-350-12544

Home > Course > Lessons > Chapter 4 > HW 4.1

HW 4.1
Value: 5 points. Unlimited attempts available.
Utilities > Submitters

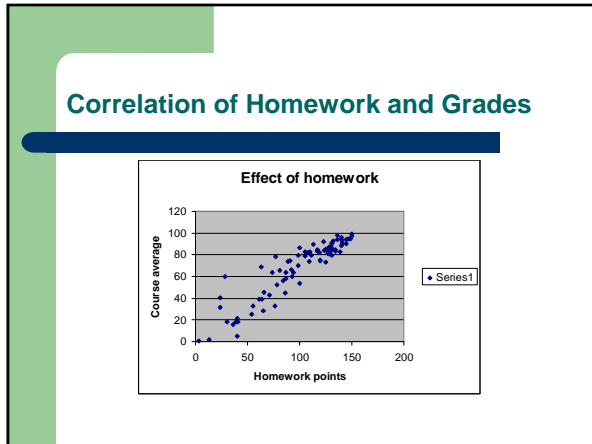
User	Grade (5 pts)	Submitted	IP Address
	5	2/25/2009 9:39:45 PM	69.149.220.52
	3	2/25/2009 8:38:43 PM	76.92.113.156
	5	2/25/2009 11:08:11 AM	72.129.180.242
	4	2/25/2009 11:05:29 AM	72.129.180.242
	4	2/25/2009 11:02:38 AM	72.129.180.242
	4	2/25/2009 10:59:29 AM	72.129.180.242
	4	2/25/2009 10:37:50 AM	72.129.180.242
	4	2/24/2009 10:42:42 AM	72.129.180.242
	5	2/22/2009 10:54:35 PM	72.133.229.38
	3	2/22/2009 9:24:24 PM	72.133.229.38
	3	2/21/2009 9:22:07 PM	64.126.50.62
	5	2/21/2009 3:12:51 PM	207.160.168.243
	5	2/20/2009 9:30:15 PM	70.215.183.171
	3	2/20/2009 9:26:17 PM	70.215.183.171
	3	2/20/2009 9:21:24 PM	70.215.183.171

Before-and-After Comparison: Homework Completion

<p>Fall 2000 (n = 32)</p> <ul style="list-style-type: none"> • 10 homework sets • 3 problems each • Instructor graded • 960 expected • total 774 problems • 81% completion 	<p>Fall 2004 (n = 33)</p> <ul style="list-style-type: none"> • 30 redo-able sets • 5 problems each • Computer graded • 4950 expected • total 12415 probs • 1504% increase!
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Before-and-After Comparison: Course Grades

<p>Fall 2000</p> <ul style="list-style-type: none"> • A: 16% • B or better: 34% • C or better: 66% • D or better: 84% • F: 16% 	<p>Fall 2004</p> <ul style="list-style-type: none"> • A: 27% • B or better: 52% • C or better: 73% • D or better: 82% • F: 18%
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Show-and-Tell Assignments

- Online postings to bulletin board
- Every student participates
- Two-part questions: facts, analysis
- Part 1: provide experience, collect info
- Part 2: compare, discuss why

Show-and-Tell Topics

- Compensation for extra work
- Differing prices for the same commodity
- Interest rates for savings
- Interest rates for loans
- Unusual practices



Message [Next Message](#)

Topic: **S&T 1: Extra Compensation** Date: July 31, 2006 9:15 AM
 Subject: **S&T Assignment #1** Author: [Wilson, Steven](#)

Different companies pay employees differently (salaried, hourly wages, commission, piecework), and different companies will have different policies regarding extra compensation when employees are asked to work above and beyond their regular commitment.

Part 1. For two different jobs, describe the policy the employer uses to compensate for work above and beyond the regular commitment. Include in your answer whether extra compensation is available, whether it is different than the regular compensation, when it begins to take effect, and how it is computed. (You could use your current job and a previous job, or two previous jobs, or your job and a friend's different job, or different jobs of two friends.)

Part 2. Compare the extra compensation policies of these two jobs. Is one clearly better than the other? Or does each have its own advantages and disadvantages? Explain. (You can use either your two examples from part 1, or your example against another student's previously posted online example, or two previously posted online examples. If your two jobs in part 1 had the same extra compensation policy, you will have to compare the policy with another student's example.)

[Edit Message](#)

[Reply](#) [Forward](#) [Lock Thread](#)

Subject	Author	Date
S&T Assignment #1	Wilson, Steven	July 31, 2006 9
Re: S&T Assignment #1		September 6, 2
Re: S&T Assignment #1		September 7, 2
Re: S&T Assignment #1		September 7, 2
Re: S&T Assignment #1		September 7, 2
Re: S&T Assignment #1		September 7, 2
Re: S&T Assignment #1		September 8, 2
Re: S&T Assignment #1		September 8, 2
Re: S&T Assignment #1		September 8, 2
Re: S&T Assignment #1		September 8, 2
Re: S&T Assignment #1		September 8, 2
Show and tell-		September 6, 2
Show and tell		September 7, 2
Show and Tell		September 7, 2
Show and Tell		September 7, 2
Show and tell-		September 7, 2
Show and Tell		September 7, 2
Show and Tell		September 8, 2
test		September 8, 2
Show and Tell		September 8, 2
S&T Ass. #1		September 8, 2
show and tell-		September 8, 2
S&T : Extra Compensation		September 10,
		September 24,

The Future?

- Online textbook ?
- More spreadsheet use ?
- Simple spreadsheet construction ?
- More international topics ?

Home Library Financial Business Math Textbook (Under Construction) 6.2 Finding Principal, Rate, or Time

6.2 Finding Principal, Rate, or Time

Example 3

How long will it take for Tim's \$1,000 deposit to earn \$120 at 4% simple interest?

Solution. The principal is 1000, the interest is 120, and the rate (in decimal form) is 0.04. The computation is:

$$T = \frac{I}{PR} = \frac{120}{1000 \cdot 0.04} = 3$$

Since rates of interest are (by default) annual rates, the time will also be in years. It will take three years for Tim's \$1,000 deposit to earn \$120 interest at an annual rate of 4%.

Example 4

Ruth paid \$500 exact interest on a 7.5% loan for 200 days. How much did she borrow?

Solution. Since the rate is an annual rate, the time must also be expressed in years. For exact interest, we use 365 days in a year, and therefore the time is $\frac{200}{365}$. As a decimal, the rate is 0.075, and the interest is 500. The computation is:

$$P = \frac{I}{Rt} = \frac{500}{0.075 \cdot \frac{200}{365}} = \frac{500 \cdot 365}{0.075 \cdot 200} \approx 12166.6666$$

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Web Pages

- Business Math Corner
www.milefoot.edu/math/businessmath/index.htm
- Steven J. Wilson
staff.jccc.edu/swilson/index.htm