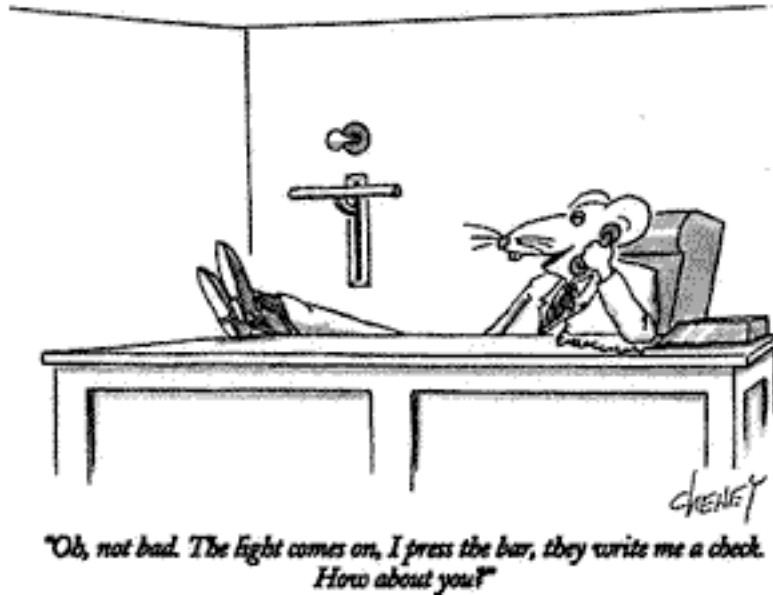


Midterm Exam KEY

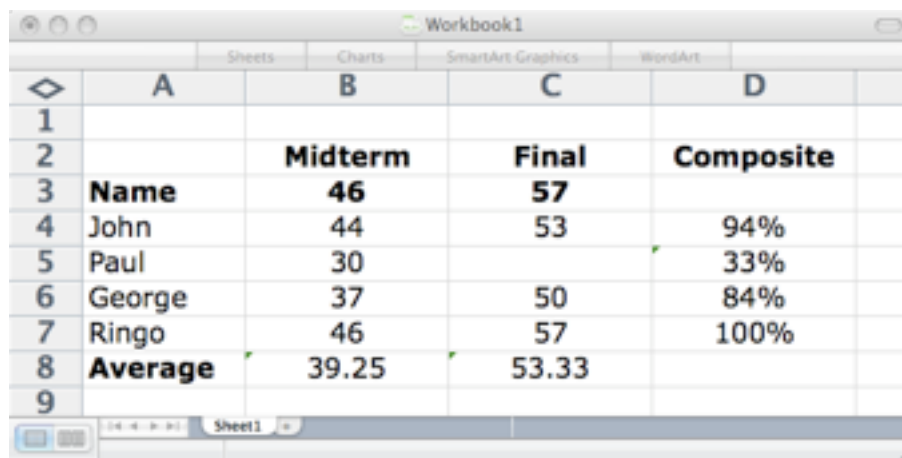
This is an open-notes exam. Please write your name at the top.



Problem	Points	Out of
What's in the cell?		6
Compounding		16
Total		22

What's in the cell?

1. (6 points) The spreadsheet below computes a composite grade for each student. The midterm and the final each contribute 50% of the composite score. The values in cells B3 and C3 indicate the total number of points available on the midterm and the final (resp). If the values in these cells were changed, the changes would ripple through the spreadsheet in the usual way.



The screenshot shows a spreadsheet window titled 'Workbook1' with a grid of cells. The columns are labeled A, B, C, and D. The rows are numbered 1 through 9. The data is as follows:

	A	B	C	D
1				
2		Midterm	Final	Composite
3	Name	46	57	
4	John	44	53	94%
5	Paul	30		33%
6	George	37	50	84%
7	Ringo	46	57	100%
8	Average	39.25	53.33	
9				

A. (3 points) Cell B8 contains an expression computing the average score for the midterm exam. This formula was copied to cell C8. What expression is in C8?

Answer:

Answer: $AVERAGE(C4:C7)$.

B. (3 points) Cell D4 contains an expression which will compute the composite score for John. This expression is copied down column D. What expression is in cell D6? (NB: the *value* of this expression in this example is .84 formatted as a percentage.)

Answer:

Answer: $(B6/B\$3+C6/C\$3) * 0.5$

Compounding

For these problems, you will likely be interested in the following functions:

FV(rate, nper, pmt, [pv], [type])	RATE(nper, pmt, pv, [fv], [type], [guess])
PV(rate, nper, pmt, [fv], [type])	NPV(rate, values)
NPER(rate, pmt, pv, [fv], [type])	IRR(values, [guess])
PMT(rate, nper, pv, [fv], [type])	

1. (3 Points) Bob is salting away money each week to buy a Honda Pilot. Bob thinks he can put away \$200/week. Give an excel expression that will show how much Bob will have after 2 years, assuming an interest rate of 5% per year.

Answer:

Answer: = Using $FV = A * [((1 + i)^n - 1) / i]$; or

$$200 * (((1 + .05/52)^{104}) / (.05/52))$$

or

$$FV(5\%/52, 104, -200)$$

2. (3 Points) Alice started a rabbit farm back on January 1, 1992. On the 2009 anniversary she had 4000 rabbits. If the rabbits reproduce at a rate of 10% per year, how many rabbits did she start out with?

Answer:

Answer: =

$$4000 / (1 + .1)^{(2009 - 1992)}$$

or

$$PV(10\%, 2009 - 1992, 0, -4000)$$

3. (4 Points) Alice started a rabbit farm back on January 1, 1992. She bought 100 rabbits that day and 100 more on each anniversary for the first 10 years. On the 10th anniversary, she bought 1000 rabbits. If the rabbits reproduce at 10% per year, how many did she have on the 2009 anniversary?

Answer:

Answer:

$$= 100 * 1.1^{(2009-1992)} + \dots + 100 * 1.1^{(2009-2001)} + 1000 * 1.1^{(2009-2002)}$$

or

$$= FV(10\%, 2009 - 2002, 0, FV(10\%, 2002 - 1992, 100, 0, 1) - 1000)$$

4. (6 Points) Bob and Alice have taken out a 30-year adjustable rate mortgage (ARM) for \$500,000. For the first 3 years, their interest rate will be 4% but then the rate will be reset to 5%. What monthly payment will be required after the rate is adjusted? (NB: The monthly payment at the lower 4% rate is calculated as though they were going to pay off the entire mortgage at 4%.)

Answer:

$$\text{Answer: } = \text{PMT}(5\%/12, 27*12, \text{PV}(4\%/12, (30*12)-(3*12), \text{PMT}(4\%/12, 30*12, -500000)))$$