

Name (printed) _____

Section _____

Name (signature) _____

ZID No. _____

INSTRUCTIONS:

- (1) Use a No. 2 pencil.
- (2) Write your name and ZID number on your answer sheet, filling in the corresponding ovals.
- (3) Write your recitation section

11, 12, . . . , 18 if your class is at 11

21, 22, . . . , 28 if your class is at 2

in the boxes marked "Section". Fill in the appropriate ovals.

- (4) This test is Form A and should have a red answer sheet. Fill in A in the oval corresponding to Form number on your answer sheet.
- (5) There are 20 questions. It is YOUR responsibility to see that you have a complete examination form. Each problem is worth 5 points.
- (6) "NOTA" means "none of the above answers is correct."

Monthly Payback Formula: $M = \frac{(1+r)^{nr}}{(1+r)^n - 1} P \quad P = \frac{(1+r)^n - 1}{(1+r)^{nr}} M$

Monthly Savings Formula: $B = \frac{(1+r)^n - 1}{r} M \quad M = \frac{r}{(1+r)^n - 1} P$

- (1) (*order of operations*) Samantha wants to calculate the most expensive car she can purchase if she can afford a payment of \$250 a month for 3 years at 12 percent annual interest. She calculates that the monthly interest is 1 percent and hence

$$P = \frac{1.01^{36} - 1}{1.01^{36} \times .01} \times 250.$$

She presses the buttons

$$(1.01^{36} - 1) \div 1.01^{36} \times .01 \times 250 =$$

on her calculator. She will get

- (a) the correct answer
- (b) the incorrect answer, because she used 1.01 instead of 1.12
- (c) the incorrect answer, because she didn't put parentheses around 1.01^{36} and $.01$
- (d) the incorrect answer, because she didn't use the memory button
- (e) NOTA

- (2) (*calculator*) Compute to eight digits on your calculator: $\frac{1.9 - \sqrt{4.3}}{3\sqrt{32}}$
 (a) -2.0101008 (b) $-.32742652$ (c) $-.010232079$ (d) 1.7778093 (e) NOTA
- (3) (*finding a sum*) Find the following sum:
 $1 - 2 + 3 - 4 + 5 - 6 + 7 - 8 + 9 - 10 + 11 - 12 + \dots + 197 - 198 + 199 - 200$
 [the repeating sign pattern is $+, -, +, -$]
 (a) 5050 (b) -100 (c) -50 (d) 0 (e) NOTA
- (4) (*size of numbers*) Which is bigger: 7.3^{39} or 12.6^{29} ?
 (a) 7.3^{39}
 (b) 12.6^{29}
 (c) both numbers are the same
 (d) the numbers are too large to tell
 (e) NOTA
- (5) (*currency conversion*) On January 1, 2005 a new currency, the Yeni Türk Liras (YTL), was introduced to Turkey. The currency was revalued and one YTL is worth 1,000,000 old Turkish Lira. One U.S. dollar is worth 1.4633 YTL. How many old Turkish Lira would you need to buy a \$3.58 extra value meal at McDonald's? (Do not count the tax.)
 (a) 190,890 old Turkish Lira
 (b) 408,743 old Turkish Lira
 (c) 2,446,524 old Turkish Lira
 (d) 5,238,614 old Turkish Lira
 (e) NOTA
- (6) (*Celsius to Fahrenheit*) What is the Fahrenheit temperature when the Celsius temperature is -10 degrees? Use the conversion formulas: $F = \frac{9}{5}C + 32$ $C = \frac{5}{9}(F - 32)$
 (a) -42 (b) -23.3 (c) 14 (d) 52 (e) NOTA
- (7) (*discounts*) A jacket in a store is on a rack marked 20 percent off. The original price of the jacket is \$50. You have a coupon that gives you "an additional 10 percent off the discounted price." How much will you pay for the jacket (not counting tax)?
 (a) 20 (b) 30 (c) 36 (d) 40 (e) NOTA

- (8) (*tips and percents*) You and your friends go out to eat in a fancy restaurant. Since there are five people in your party, the restaurant policy is to add a 17% tip to your bill. If your final bill is \$150.83, including the tip, how much was the bill before the tip was added on?
- (a) 1.17×150.83 (b) $(.83) \times 150.83$ (c) $\frac{150.83}{1.17}$ (d) $\frac{150.83}{.83}$ (e) NOTA
- (9) (*student loans*) When you graduate from NIU you owe \$40,000 in students loans. You postpone the loans for five years while you attend graduate school. The interest on your student loans accrues at 6.5% interest compounded **annually**. How much will you owe for these loans after 5 years?
- (a) \$42,600 (b) \$51,458 (c) \$51,602 (d) \$54,803 (e) NOTA
- (10) (*APR versus APY*) Bill's SEARS credit card has a 22.0% APR, compounded monthly. What is the Annual Percentage Yield (APY) of this credit card agreement?
- (a) 22.0% (b) 24.36% (c) 19.58% (d) 1.833% (e) NOTA

The next two questions relate to the following problem: You want to finance a car at Big Eddie's Car Emporium. You can afford a payment of \$250 a month for 3 years at 12 percent annual interest.

- (11) (*car loan*) What is the most expensive car you can afford? (Assume you are financing 100% of the purchase price and ignore taxes and other fees.)
- (a) \$2,419 (b) \$7,205 (c) \$7,527 (d) \$8,306 (e) NOTA
- (12) (*total interest*) How can you determine the total interest you will you pay over the three years?
- (a) Subtract the answer to the previous problem from 9000
 (b) Compute $1.01^{36}250$
 (c) Subtract $1.01^{36}250$ from 9000
 (d) Use the monthly payback formula
 (e) NOTA
- (13) (*service loans*) A company advertises "Loans Before Payday." Your weekly paycheck is \$260. They will advance you the 260 dollars a week before payday for a \$25 fee. How much annual interest are they charging you? (There are 52 weeks in a year.)
- (a) 3.85% (b) 9.61% (c) 10% (d) 500% (e) NOTA

- (14) (*annuities*) What is the cost of an annuity that pays 1 million dollars per year over the next 30 years at 5.25% annual interest? Interest is compounded yearly.
 (a) \$6,463,357 (b) \$14,943,901 (c) \$21,407,257 (d) \$69,362,878 (e) NOTA
- (15) (*mortgage loans*) Which of the following are advantages of a 15 year loan versus a 30 year loan for purchasing a house?
 (a) lower monthly payment
 (b) less total interest
 (c) smaller downpayment
 (d) smaller property taxes
 (e) NOTA
- (16) (*slope of a line*) What is the slope of the line passing through the points (2, 3) and (5, 10)? (a) $3/2$ (b) 2 (c) $7/4$ (d) $-7/2$ (e) NOTA
- (17) (*parallel lines*) Which of the following four lines is parallel to the line $y = \frac{2}{5}x + 5$:
 (a) $5x + 2y = 1$ (b) $5x - 2y = 1$ (c) $2x - 5y = 1$ (d) $2x + 5y = 1$ (e) NOTA
- (18) (*word problem; systems of equations*) Donna joins a fitness club for which she pays a monthly fee besides her initial membership fee. At the end of 4 months she had paid a total of \$172, and at the end of 7 months she had paid \$259. How much was the monthly fee?
 (a) \$29 (b) \$37 (c) \$43 (d) \$56 (e) NOTA
- (19) (*feasible region*) Which of the following does *not* lie in the region:

$$\begin{cases} x + 4y \geq 4 \\ 3x + 5y \geq 6 \\ 30x + 40y \geq 80 \\ x \geq 0, y \geq 0 \end{cases}$$
 (a) (4,0) (b) (0,2) (c) (3,2) (d) $(\frac{4}{7}, \frac{6}{7})$ (e) $(2, \frac{1}{2})$
- (20) (*linear programming*) The function $P = 5x - 8y$ is to be minimized over a triangular shaped region, whose corner points are $A = (2, 4)$, $B = (11, 5)$, and $C = (-3, 1)$. What is the minimum value of P ?
 (a) -23 (b) -22 (c) 0 (d) 15 (e) NOTA