You will be able to use a calculator, and will have to use one to answer some questions. **This test will have Three Sections: True/False ($10 \times 1 = 10$ marks), Multiple Choice ($10 \times 2 = 20$ marks), Short Answer ($10 \times 7 = 70$ marks)**. This practice set of problems is not inclusive of all concepts you may see on the test, so read the notes as well as you prepare.

Information Provided on Test:

Simple Interest: $A = P(1 + rt)$

Compound Interest: $A = P(1 + i)^n$

Depreciation: $A = P(1 - i)^n$

Continuous Interest: $A = Pe^{rt}$

APY: $= \left(1 + \dfrac{r}{m}\right)^m - 1$

Static Reserve: $= \dfrac{S}{U}$

Geometric series: $1 + x + x^2 + \cdots + x^{n-1} = \dfrac{x^n - 1}{x - 1}$

Savings formula: $A = d\left[\dfrac{(1 + i)^n - 1}{i}\right]$

Amortization formula: $d = P\left[\dfrac{i}{1 - (1 + i)^{-n}}\right]$

Exponential Reserve: $= \dfrac{\ln\left[1 + (S/U)r\right]}{\ln\left[1 + r\right]}$

| Year	Annual	Year	Annual	Year	Annual	Year	Annual
1980	82.4	1986	109.6	1992	140.3	1998	163.0
1981	90.9	1987	113.6	1993	144.5	1999	166.6
1982	96.5	1988	118.3	1994	148.2	2000	172.2
1983	99.6	1989	124.0	1995	152.4	2001	177.1
1984	103.9	1990	130.7	1996	156.9	2002	179.9
1985	107.6	1991	136.2	1997	160.5	2003	184.0

Consumer Price Index: Not Seasonally Adjusted, U.S. city average, All items, Base Period: 1982-84=100.
SOURCE: http://www.bls.gov/cpi/home.htm


Section 1. True or False Circle True (T) or False (F):

(1) Compound interest means you earn interest on the principal only ....T   F

(2) The amount of money after one year in an account that earns compound interest increases as the time period for which compounding is applied increases ....T   F

(3) Arithmetic growth is growth proportional to the amount present ....T   F

(4) Exponential decay is geometric growth with a negative rate of growth ....T   F

(5) Depreciation of an item is determined by using a simple interest formula ....T   F

(6) The Consumer Price Index is needed to compare values of items in different years since the rate of inflation is not constant over time ....T   F

(7) When a loan is amortized, the amount that is paid towards reducing the principal is the same each month ....T   F

Section 2. Multiple Choice Circle the most appropriate answer:

(1) You have $2500 that you invest at 6% simple interest. What is the balance after four years?

    A) $310   B) $3000   C) $3100   D)$3156.19

(2) What is the Annual Percentage Yield (APY) for an annual rate of 5.3% compounded quarterly?

    A) 5.3%   B) 5.4%   C) 5.5%   D) 5.6%

(3) You have $2500 that you invest at 6% compound interest, compounded monthly. What is the balance after four years?

    A) $3000   B) $3100   C) $3156.19   D) $3176.22

(4) What is the Annual Percentage Yield (APY) for an annual rate of 6% compounded monthly?

    A) 0.500%   B) 6.000%   C) 6.090%   D) 6.168%

(5) The following graph represents the amount of money in a savings account, where there is an initial amount deposited of $100 and no more deposits made. The interest earned on the account is

A) simple interest.
B) compound interest compounded yearly.
C) compound interest compounded monthly.
D) there is not enough information given to answer the question.
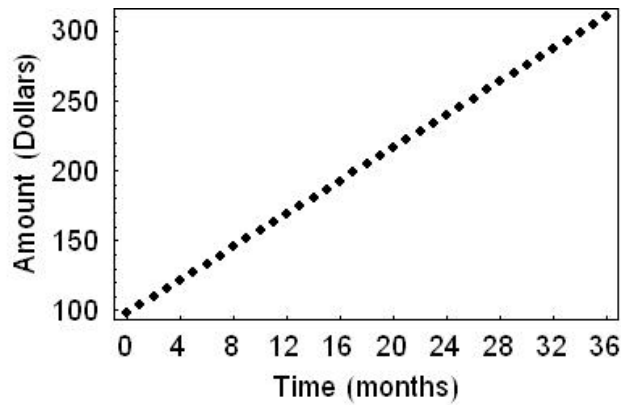
(6) Which of the following graphs could represent the accumulated balance on a bond which earns compound interest?

      A)   B)   C)   D)
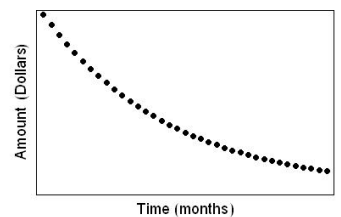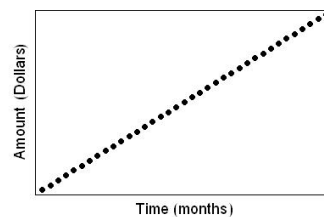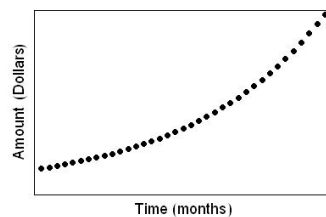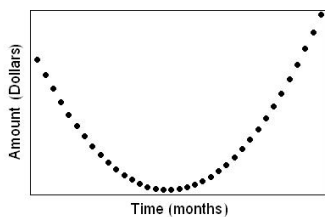
(7) If the annual interest rate on a credit card is 6%, then the APR (annual percentage rate) is

    A) 6.00%   B) 6.09%   C) 6.18%   D) 7.25%

(8) A house cost \$24,000 in 1987. What would the cost of the house be in 2003 dollars?

    A) \$14,817.39   B) \$40,787.24   C) \$1,6896,000   D) \$38,873.24

(9) The rule of 70 for population doubling says that a population that is growing at a constant rate of $r\%$ per year will double in size in

    A) 70 years   B) $70/r$ years   C) $70r$ years   D) 70^r years

(10) For the following reproduction curve, the equilibrium population is
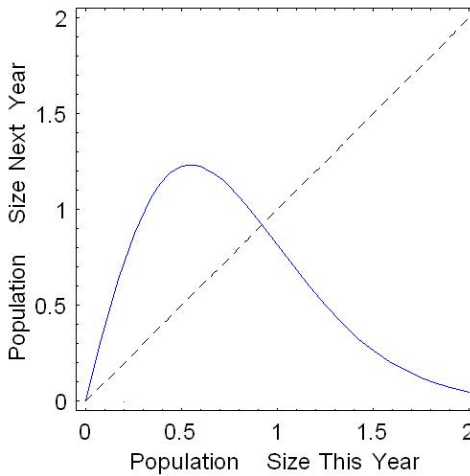
    A) 0   B) 1   C) 0.5   D) 2   E) There is no equilibrium   F) Both A and B

(11) For the logistic population model $f(x) = 3x(1 - x)$, if the starting population fraction is 0.4, then the next population fraction is

    A) 0.116   B) 0.416   C) 0.720   D) -36

(12) At the start of 2010, world oil reserves totalled 1476 billion barrels, with daily consumption of 84.4 million barrels. What is the static reserve for oil?

    A) 17.5 days   B) 17.5 years   C) 47.9 years   D) 17,488.2 years

Section 3. Short Answer

(1) The population of India in 2011 was 1.21 billion people. Assume the population is expected to grow at a rate of 1.8% per year. Use the rule of 70 to estimate how long it will take for the population to double.

(2) If the population begins at 1.5, draw a cobweb diagram on the following reproduction curve:
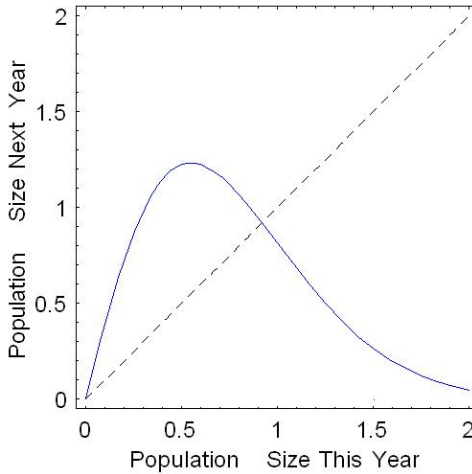
(3) The population of U.S.A. in 2013 is 315,645,000 people. If the population is expected to grow at a rate of 1.8% per year, what will the population be in 2040?

(4) A population of 100 exhibits arithmetic growth of 10 units per month. What is the population in after 1 year?

(5) A car depreciates at 15% per year and cost $25,000 in 2007. What will it's value be in 2013?

(6) You purchase a home for $99,000 with an annual interest rate of 6.375% and a 30 year mortgage. What are your monthly payments, and how much of the first monthly payment goes towards interest?

(7) Suppose that you have a bank account with a balance of $4532.10 at the beginning of the year and $4632.10 at the end of the year (you made no deposits to the account). What is the effective interest rate?

(8) Coal accounts for 30% of U.S. energy use, including 50% of electricity. Recoverable reserves of U.S. coal would last about 250 years at the current rate of use, so the static reserve is 250 years. How long would the supply last if the rate of use increases 1% per year, about the growth rate of the U.S. population?