

PROBLEMS ON COMPOUND INTEREST

I.3 If \$1.00 is invested at an annual rate of interest of 12% compounded 4 times each year, then after six years the value of the investment, in dollars, is

- (a)  $(1.12)^6$  (b)  $(1.03)^{24}$  (c)  $(1.02)^{18}$  (d)  $(1.12)^6$   
 (e) 1.72

II.31 If the value of an investment at an annual rate of  $r\%$  compounded semiannually is to double after one year, then  $r$  is nearest the rate

- (a) 67 (b) 75 (c) 83 (d) 91 (e) 50

III.11 What is the rate of investment, which when multiplied by 100 gives a percent, if the value of an investment, compounded  $n$  times per year, is to double in one year.

- (a)  $2/(n + 1)$  (b)  $\log_2 2n$  (c)  $\log_n (2 - n)$  (d)  $n(2^{1/n} - 1)$   
 (e)  $2 - 2^{1/n}$

IV.18 What investment at an annual rate of 12% compounded 4 times per year will be worth \$1,000 in 10 years?

- (a)  $1000(1.03)^{-40}$  (b)  $4000(1.12)^{-10}$  (c)  $100(1.03)^4$   
 (d)  $10000(1.03)^{-12}$  (e)  $1000(1.40)^{-12}$

V.13 The amount which must be invested at an annual rate of 12% compounded 4 times per year to have value 1000 in 10 years is  $1000/Q$  where  $Q =$

- (a)  $(1.12)^{30}$  (b) 1.48 (c)  $30 \log_{12} .03$  (d)  $(1.03)^{40}$   
 (e)  $12 \log_{10} 40$

VI.14 At what real number interest rate  $r$ , compounded two times per year, will an investment triple in 10 years?

- (a)  $1/8$  (b)  $2^{3/20} - 1$  (c)  $2(3^{1/20} - 1)$   
 (d)  $\ln(1 + 3/2^{10})$  (e)  $10 e^{2/3}$

VIII.28 A certain investment has a fixed rate of interest and is compounded daily. If the value of the investment doubles in 10 years, the total number of years for the original investment to triple in value is best approximated by which of the following (log base may be any positive number)

- (a)  $3 \log 10 / \log 2$  (b)  $(10 \log 4) / \log 3$   
 (c)  $(10 \log 3) / \log 2$  (d)  $\log 30 / \log 2$   
 (e)  $(15 \log 10) / (2 \log 3)$

IX.21 An amount of money is invested at an annual rate of  $r$  compounded 4 times per year. At what annual rate compounded 2 times per year would the same investment produce the same interest.

- (a)  $2r$  (b)  $r + r^2 - r^4$  (c)  $r + r^2/8$   
 (d)  $r + r^2 + r^3/4$  (e)  $42r/41$

X.10 If an investment is compounded annually for 10 years at a rate  $r$ , then the value of the investment will triple if

- $r + 1 =$  (a)  $\log_{10} 3$  (b)  $10^{1/3}$  (c)  $3^{1/10}$  (d)  $\log_3 10$   
 (e)  $1/10^{1/3}$