1. You open a bank account on 1 January with D dollars and make additional deposits of P on 1 October, 1 November, and 1 December. Interest is 6% a year compounded monthly. If you have no other deposits or withdrawals, then the amount in your account next 1 January is:

   (a) $D(1.005)^{12} + P(1.005)^9 + P(1.005)^6 + P(1.005)^3$

   (b) $D(1.015)^4 + P(1.015)^3 + P(1.015)^2 + P(1.015)^1$

   (c) $(1.005)^{12} \{D + P + P(1.005)^{-3} + P(1.005)^{-6}\}$

   (d) $D(1.005)^{12} + P(1.005)^1 + P(1.005)^2 + P(1.005)^3$

   (e) $D(1.015)^4 + P(1.015)^2 + P(1.015)^1 + P$

2. If g is a function, and $g(x \cdot y) = g(x) + g(y)$ for all numbers x and y, and $g(9) = 4$, then $g(3)$ equals:

   (a) -1   (b) 0   (c) 2   (d) 4   (e) 1

3. You borrow $10,000$ now at 18% interest rate compounded annually. If the loan is repaid in five years with five equal annual payments payable at the beginning of each year, starting now, the annual payment to the nearest cent is :

   (a) $2,867.92   (b) $2,939.59   (c) $3,054.79   (d) $2,709.98   (e) $2,632.84

4. You borrow $10,000$ now at 12% interest rate, compounded annually for five years. If the loan is repaid in three equal annual payments payable at the ends of years 3, 4, 5, the annual payment to the nearest cent is :

   (a) $5,352.15   (b) $5,222.68   (c) 5,849.40   (d) $5,792.25   (e) $5,681.09

5. Suppose we have an *annuity due* with $ 1000 to be paid at the *beginning* of each month for 5 years at the annual interest rate 12% compounded monthly. Find the present value of the annuity due :

   (a) $ 45,404.59   (b) $ 44,955.04   (c) $ 81,669.67   (d) $ 82,486.37   (e) $ 93,426.78

6. To study how humans learn, a scientist repeatedly goes through a maze. The time required to exit the maze on the nth trial is given by $f(n) = 4 + \frac{9}{n}$ minutes. On which trial did the scientist first exit the maze in 6 minutes or less?

   (a) 4th trial   (b) 5th trial   (c) 6th trial

              (d) 7th trial   (e) None of the previous

7. If $f(x) = g(x + 5)$ and $g(x) = x^2 + 2x + 1$, compute $f(1)$.

   (a) 16   (b) 25   (c) 36   (d) 49   (e) 64

8. Candy has decided to pay off two loans on which she has not made any previous repayment. The first loan is a loan in which she obtained $8,000$ one year ago at a rate of 5% compounded quarterly. The second is a loan where $12,000$ is due in two year at a rate of 7% compounded monthly. To the nearest dollar, how much is due now?

(a) $18,844 \qquad$ (b) $18,881 \qquad$ (c) $21,410 \qquad$ (d) $18,049 \qquad$ (e) $22,205

9. A car rental company estimates that a new saloon car that costs $ 185,000 will have a salvage value of $ 75,000 after it being in service for four years. We want to set up a sinking fund with each payment paid at the end of each month to replace the used car at the end of the service period. Suppose the interest rate is 5.2%, and that the interest of the sinking fund is compounded monthly, the company will pay a monthly payment of:

(a) $ 2,060.00 \qquad$ (b) $ 550.21 \qquad$ (c) $ 2,076.53 \qquad$ (d) $ 2,019.83 \qquad$ (e) $ 2,066.53

Answers: 1.d 2.c 3.d 4.b 5.a 6.b 7.d 8.a 9.e