1. Find the roots of the following quadratics:
    a. $y = (x-1)(x+6)$
    b. $y = x^2 + 4x + 3$
    c. $y = x^2 + 3$
    d. $y = x^2 - 10x + 25$
    e. $y = (x-1)(x-7)$
    f. $y = x(x+11)$
    g. $y = x^2$
    h. $y = x^2 - 3x$
    i. $y = 3x^2 + 2x + 4$
    j. $4(2x - 6)(x + 16) = 0$
    k. $3x^2 + 2x + 4 = 10$

2. Without using a calculator, find:
    a. $\log_{10} 100$
    b. $\log_4 16$
    c. $\log_9 3$
    d. $\ln e^5$

3. In each case, find $\dfrac{dy}{dx}$.
    a. $y = 3x - 8$
    b. $y = -7x^2 - 14$
    c. $y = (x+2)(x-1)$
    d. $y = \dfrac{3}{x^2}$
    e. $y = e^x + 3x^2$
    f. $y = x^2 \ln x$

4. If $100 is invested for 3 years at a rate of 24% per annum, find the final balance if interest compounds:
    (i) annually?
    (ii) every six months?
    (iii) monthly?
    (iv) continuously?

5. Jim's parents invest $1000 in a bank account on the day he is born, earning 20% interest per annum, for him to spend when he reaches the age of 30.

    (a) If interest compounds annually, what will be the account balance when he turns 30? (Use $1.2^{30} = 237.38$.)

    (b) If interest compounds continuously, what will be the account balance when he turns 30? (Use $e^6 = 403.4$.)

    (c) Mary is born on the same day as Jim, but her parents do not start an investment account until her 20th birthday. Assuming her account also earns 20% compounding continuously, how much do they need to invest so that her account balance at age 30 exactly matches Jim's?

    (d) If Mary's parents can find an account which earns 30% compounding continuously, how much do they need to invest on her 20th birthday so that her account at age 30 exactly matches Jim's?