(b) Calculate t for the B calculated in part (a), from the monthly compounded interest formula, Equation (1).

(c) Determine the number of years and months that correspond to t.

The problem is solved by writing the following program in a script file:

```
% Solution of Sample Problem 1-4
P=5000;   r=0.085;   ta=17; n=12;
B=P*(1+r)^ta                        Step (a): Calculate B from Eq. (2).
t=log(B/P)/(n*log(1+r/n))           Step (b): Solve Eq. (1)
                                    for t, and calculate t.

years=fix(t)                        Step (c): Determine the number of years.
months=ceil((t-years)*12)           Determine the number of months.
```

When the script file is executed, the following (the values of the variables B, t, years, and months) is displayed in the Command Window:

```
>> format short g
B =
        20011

t =
        16.374              The values of the variables B, t,
                            years, and months are displayed
years =                     (since a semicolon was not typed at the
    16                      end of any of the commands that calcu-
                            late the values).
months =
    5
```

1.10 PROBLEMS

The following problems can be solved by writing commands in the Command Window, or by writing a program in a script file and then executing the file.

1. Calculate:

(a) $\dfrac{22 + 5.1^2}{50 - 6.3^2}$ (b) $\dfrac{44}{7} + \dfrac{8^2}{5} - \dfrac{99}{3.9^2}$

2. Calculate:

(a) $\dfrac{\sqrt{41^2 - 5.2^2}}{e^5 - 100.53}$ (b) $\sqrt[3]{132} + \dfrac{\ln(500)}{8}$

3. Calculate:

     (a) $\dfrac{14.8^3 - 6.3^2}{(\sqrt{13} + 5)^2}$ (b) $45\left(\dfrac{288}{9.3} - 4.6^2\right) - 1065e^{-1.5}$

4. Calculate:

     (a) $\dfrac{24.5 + 64/3.5^2 + 8.3 \cdot 12.5^3}{\sqrt{76.4} - 28/15}$ (b) $(5.9^2 - 2.4^2)/3 + \left(\dfrac{\log_{10} 12890}{e^{0.3}}\right)^2$

5. Calculate:

     (a) $\cos\left(\dfrac{7\pi}{9}\right) + \tan\left(\dfrac{7}{15}\pi\right)\sin(15°)$ (b) $\sin^2 80° - \dfrac{(\cos 14° \sin 80°)^2}{\sqrt[3]{0.18}}$

6. Define the variable x as $x = 6.7$, then evaluate:

     (a) $0.01x^5 - 1.4x^3 + 80x + 16.7$ (b) $\sqrt{x^3 + e^x - 51/x}$

7. Define the variable t as $t = 3.2$, then evaluate:

     (a) $56t - 9.81\dfrac{t^2}{2}$ (b) $14e^{-0.1t}\sin(2\pi t)$

8. Define the variables x and y as $x = 5.1$ and $y = 4.2$, then evaluate:

     (a) $\dfrac{3}{4}xy - \dfrac{7x}{y^2} + \sqrt{xy}$ (b) $(xy)^2 - \dfrac{x+y}{(x-y)|^2} + \sqrt{\dfrac{x+y}{2x-y}}$

9. Define the variables a, b, c, and d as:

     $a = 12$, $b = 5.6$, $c = \dfrac{3a}{b^2}$, and $d = \dfrac{(a-b)^c}{c}$, then evaluate:

     (a) $\dfrac{a}{b} + \dfrac{d-c}{d+c} - (d-b)^2$ (b) $e^{\frac{d-c}{a-2b}} + \ln\left(\left|c - d + \dfrac{b}{a}\right|\right)$

10. A sphere has a radius of 24 cm. A rectangular prism has sides of a, $a/2$, and $a/4$.
   (a) Determine a of a prism that has the same volume as the sphere.
   (b) Determine a of a prism that has the same surface area as the sphere.