Time Value 1

1. $FV_n = PV(1+r)^n$; $2000(1+0.12)^5$

2. $PV = \frac{FV_n}{(1+r)^n}$; $\frac{2000}{(1+0.1)^5}$

3. $1677 = 1000(1+r)^6$; $\sqrt[6]{\frac{1677}{1000}} - 1$

4. a) $1000000(1+0.05)$
   b) $1000000(1+0.05)^5$

5. $\frac{100000}{(1+0.1)^{20}}$

6. $(1+0.1)^n = 2$

   $1.1^n = 2$; $\ln 1.1^n = \ln 2$

   $n \ln 1.1 = \ln 2$; $n = \frac{\ln 2}{\ln 1.1}$

Time Value 2

1 $FV = PV\left(1 + \frac{r}{m}\right)^{m \cdot n}$ for m compounding periods.

$$\frac{1000}{\left(1 + \frac{0.12}{4}\right)^{4.5}}$$

2. $1000 = C \cdot \frac{1 - (1+0.1)^{-5}}{0.1}$

$$C = \frac{1000}{\frac{1-(1+0.1)^{-5}}{0.1}} = \frac{1000}{A_{5,10\%}}$$

3 $10000 = 1,467.57 \cdot A_{0.1,n}$

$$10000 = \frac{1467.57}{1+0.1} + \frac{1467.57}{(1+0.1)^2} + \ldots + \frac{1467.5}{(1+0.1)^n}$$

use Excel to solve for n

4. $200000 = \frac{18,878.61}{1+r} + \frac{18,878.61}{(1+r)^2} + \ldots + \frac{18,878.61}{(1+r)^{20}}$

You can solve this with linear approximation or in Excel.

5.

$$? = \frac{10,000}{1+0.12} + \frac{10,000}{(1+0.12)^2} + \ldots + \frac{10,000}{(1+0.12)^{40}}$$

6. $10,000 \cdot A_{40,12\%} - 10,000\, A_{20,12\%}$.