

**Useful Guidelines:**

If  $P$  is the amount invested at an interest rate  $r$  per year, the future value  $S$  at the end of  $t$  years is

\*  $S = P(1+r)^t$ , with annual compounding.

\*  $S = P(1 + \frac{r}{k})^{kt}$ , with periodic compounding.

weekly = 52  
monthly = 12  
quarterly = 4

*20/30/40*  
*per*  
*mb.*

[Periodic compounding: the interest is compounded  $k$  times per year and the interest rate per period is  $\frac{r}{k}$ .]

1. If \$4,400 is invested for  $t$  years at 6% interest compounded annually, find the future value that results in

a) 10 years  $S = P(1+r)^t$

b) 20 years  $S = P(1+r)^t$

$P = 4400$   
 $r = 6\%$   
 $t = 10 \text{ year}$   
 $S = 4400(1 + 0.06)^{10}$   
**\$ 7,879.73**

$P = 4400$   
 $R = 6\%$   
 $t = 20$   
 $S = 4400(1 + 0.06)^{20}$   
**\$ 14,111.40**

2. If \$20,000 is invested at 8% interest compounded quarterly, find the future value in

a) 20 years  $S = P(1 + \frac{r}{k})^{kt}$

b) 30 years  $S = P(1 + \frac{r}{k})^{kt}$

$P = 20,000$   
 $r = 0.08$   
 $k = 4$   
 $t = 20$   
 $S = 20,000(1 + \frac{0.08}{4})^{(4)(20)}$   
 $S = 20,000(1.02)^{80}$   
**\$ 97,508.78**

$P = 20,000$   
 $R = 0.08$   
 $k = 4$   
 $t = 30$   
 $S = 20,000(1 + \frac{0.08}{4})^{(4)(30)}$   
 $S = 20,000(1.02)^{120}$   
**\$ 215,303.26**

3. If \$5,000 is invested at 12% interest compounded monthly, find the interest earned in 10 years.

$P = 5,000$   
 $r = 0.12$   
 $k = 12$   
 $t = 10$   
 $S = P(1 + \frac{r}{k})^{kt}$   
 $S = 5,000(1 + \frac{0.12}{12})^{(12)(10)}$   
 $S = 5,000(1.01)^{120}$   
**\$ 14,501.93**