18.5

– 4. $32+32(.6)+32(.6)^2+\cdots=\frac{32}{1-(0.6)}=80$

11. $4000=P(1+\frac{.045}{12})^{23}+P(1.00375)^{22}+\cdots P=\dfrac{P(1-(1.00375)^{24})}{1-(1.00375)}=25.06P \Rightarrow P=\$159.59$

- 16.(a) $100000=\dfrac{P}{(1.01)^{360}}+\dfrac{P}{(1.01)^{359}}+\cdots+\dfrac{P}{(1.01)^{1}}=\dfrac{P\left((\frac{1}{1.01})^{1}-(\frac{1}{1.01})^{361}\right)}{1-(\frac{1}{1.01})}\Rightarrow P\approx\$1028.61$

(b) $100000=\dfrac{Q\left(\frac{1}{1+\frac{0.0675}{12}}-\left(\frac{1}{1+\frac{0.0675}{12}}\right)^{361}\right)}{1-\left(\frac{1}{1+\frac{0.0675}{12}}\right)}\Rightarrow Q\approx 648.60$, hence she has monthly savings of \$380.01

19. Using the half-life, $1=2e^{3k} \Rightarrow \ln(\frac{1}{2})=3k \Rightarrow k=\frac{1}{3}\ln(\frac{1}{2})$.

(a) $SAR=2+2e^{3k}+2e^{6k}+\cdots=2+1+\frac{1}{2}+\frac{1}{4}+\cdots=\frac{2}{1-\frac{1}{2}}=4$ is upper limit, never quite reached.

(b) $SAB=2+2e^{2k}+2e^{4k}+\cdots=\frac{2}{1-e^{2k}}\approx 5.4048$, so he eventually gets to a level above the equivalent of taking 5 all at once.