Useful Discounting Formulae

1. End Value: Time $t$ value of $V_0$.
   \[ V_t = V_0(1 + r)^t \]  
   \[(1)\]

2. Present Value: Time 0 value of $V_t$.
   \[ V_0 = \frac{V_t}{(1 + r)^t} \]  
   \[(2)\]

3. PV, compounded monthly for $m$ months: Time 0 value of $V_m$.
   \[ V_0 = \frac{V_m}{(1 + \frac{r}{12})^m} \]  
   \[(3)\]

4. PV (continuous compounding).
   \[ V_0 = Ve^{-rt} \]  
   \[(4)\]

5. PV of perpetual annual series: Receive $K$ every year in perpetuity (starting next year!)
   \[ V_0 = \frac{K}{r} \]  
   \[(5)\]

6. PV of terminable annual series: Receive $K$ every year until year $T$.
   \[ V_0 = K\frac{(1 + r)^T - 1}{r(1 + r)^T} \]  
   \[(6)\]

7. PV of perpetual periodic series: Receive $K$ every $j$ years in perpetuity.
   \[ V_0 = \frac{K}{(1 + r)^j} - 1 \]  
   \[(7)\]

8. PV of terminable periodic series: Receive $K$ every $j$ years until year $T$.
   \[ V_0 = K\frac{(1 + r)^T - 1}{(1 + r)^T[(1 + r)^j - 1]} \]  
   \[(8)\]