Present Value

PV of $100 \ n \ years \ from \ now = \ \frac{100}{(1+i)^n}.

$100 \ tomorrow \ is \ worth \ less \ than \$100 \ today. \ In \ other \ words, \$100 \ in \ any \ future \ time \ has \ to \ be \ ‘discounted’. \ Discounting \ can \ be \ regarded \ as \ the \ reverse \ of \ addition \ of \ interest. \ Consider \ the \ situation \ where \ you \ know \ that \ you \ are \ going \ to \ need \$100 \ dollars \ same \ time \ next \ year \ to \ take \ care \ of \ an \ expenditure \ (say, \ to \ buy \ two \ season \ tickets \ to \ a \ tournament). \ So, \ you \ ask \ yourself, \ “how \ much \ should \ I \ set \ aside \ today \ so \ that \ next \ year \ I \ will \ have \$100 \ available?” \ Suppose, \ the \ saving \ account \ in \ your \ bank \ offers \ an \ interest \ rate \ of \ 0.10 \ (or, \ 10%). \ So, \ all \ you \ have \ to \ do \ is \ deposite \$90.9 \ in \ your \ account. \ Next \ year, \ when \ you \ withdraw \ your \ money, \ you \ will \ have \ available \$90.9 \ plus \ an \ interest \ amount \ of \$9.09 \ equal \ to \$100. \ Similarly, \ a \ foreseen \ expenditure \ of \$100 \ in \ two \ years \ time \ could \ be \ met \ by \ setting \ aside \$82.6 \ now \ in \ an \ investment \ earning \ 10\% \ compound \ interest. \ At \ the \ end \ of \ first \ year, \ this \ amount \ will \ be \$90.86. \ The \ second \ year, \ you \ will \ earn \ interest \ on \$90.86 \ and, \ at \ the \ end \ of \ the \ second \ year, \ you \ will \ have \ available, \$100.

The discount factor is, \ \frac{1}{(1+i)^n}.

To evaluate the value of $100 one year from now, 
\text{discount factor} = \frac{1}{(1+i)}, \ \text{value of }$100 = \frac{100}{(1+i)}.

To evaluate the value of $100 two years from now, 
\text{discount factor} = \frac{1}{(1+i)^2}, \ \text{value of }$100 = \frac{100}{(1+i)^2}.

To evaluate the value of $100 twenty years from now, 
\text{discount factor} = \frac{1}{(1+i)^{20}}, \ \text{value of }$100 = \frac{100}{(1+i)^{20}}.