

This is the formula for the solution of our finite difference equation. The formula is an *equation*. The *name* of the equation is formula.

> **formula:=yn=y0\*a^n+b\*(1-a^n)/(1-a);**

$$\text{formula} := yt = y0 a^t + \frac{b(1-a^t)}{1-a}$$

We can substitute the appropriate parameters for our loan model:

> **formula2:=subs(b=-P,a=1+rate/12,formula);**

$$\text{formula2} := yt = y0 \left( 1 + \frac{1}{12} \text{rate} \right)^t + \frac{12 P \left( 1 - \left( 1 + \frac{1}{12} \text{rate} \right)^t \right)}{\text{rate}}$$

And here we solve for the payment P.

> **payment:=solve(formula2,P);**

$$\text{payment} := -\frac{1}{12} \frac{\text{rate} \left( yt - y0 \left( 1 + \frac{1}{12} \text{rate} \right)^t \right)}{-1 + \left( 1 + \frac{1}{12} \text{rate} \right)^t}$$

Let's plug some numbers into the solution for the payment.

> **subs(rate=0.08,y0=100000,n=360,yn=0,payment);**

443.2061032

We could have done all this differently. We could have plugged in the numbers first and then solved for P. Or instead of naming the results of each little calculation, we could have used % to refer to the previous line.