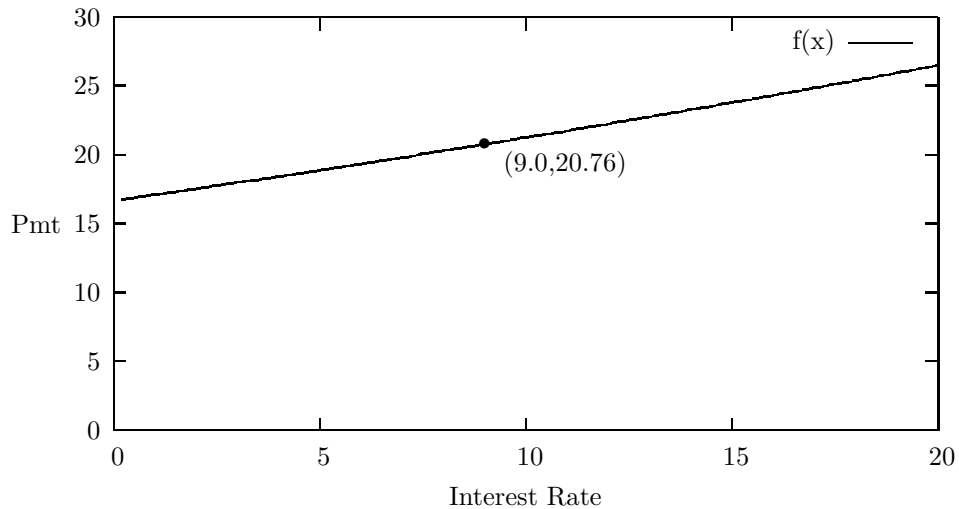# cs102 lab 1

$$payment = \frac{intRate \times \frac{principal}{payPerYear}}{1 - (\frac{intRate}{payPerYear} + 1)^{-payPerYear \times numYears}}$$

For example, the payment for interest rate of .09, principle of 1000, with 12 payments per year, and 5 years for loan.

$$payment = \frac{.09 \times \frac{1000}{12}}{1 - (\frac{.09}{12} + 1)^{-12 \times 5}}$$

Loan Payment

Design:

- inputs: interest rate
- outputs: monthly payment
- process (convert inputs to outputs)
    - Assume principal is \$1,000
    - Payments per year is 12
    - The loan will be repaind in 5 years
    - ask user to enter the interest rate
    - then call function f (which calls function pmt which use the formula to calculate the monthly payment)

```cpp
#include <iostream>
#include <cmath>
#include <iomanip>
using namespace std;
double f(double r);
double pmt(double r,double p,double ppy,double n);
int main ()
{
    cout << "Lab 1" << endl;
    cout<< fixed << setprecision(2);                              10
    cout << "Enter interest rate (e.g. 9 for 9%) ";
    double r;  cin >> r;
    cout << "Your montly payment is: $"<< f(r) << endl;
    return 0;
}
double f(double r)
{
    return pmt(r,1000.0,12.0,5.0);
}
double pmt(double r, double p, double ppy, double n)           20
{
    return ((r/100.0) * (p/ppy)) / (1-pow((r/100.0/ppy+1),-(ppy*n)));
}
```

```
debian@debian:~/cs102/lab1$ ./lab
Lab 1
Enter interest rate (e.g. 9 for 9%) 9
Your montly payment is: $20.76
```