

## Personal Loans Math Project

### Tips for How to be Smart When Taking out Personal Loans:

- It is beneficial to “shop around” and compare APR’s. The annual percentage rate tells the true cost of a loan taking into account the interest payable, any other charges, and when the payments fall due. Your bank may say they are providing you preferential rates however, interest rates can differ up to 3% depending on the bank.
- Check the small print to make sure you are eligible to apply for a loan. Many banks have certain terms and conditions to receive a personal loan. This can be based on the type of credit card you use, or your credit score. Some places only offer their best loan rates to current account customers.
- Think about early repayment plans. Don’t forget that it’s possible you will be able to pay off your debt early. Many loan providers will apply a charge if you wish to do so, so it’s a good idea to check how much this might cost before you apply for a particular deal. If you think there is a good chance you will want to settle your loan early, it may be worth searching for a deal that comes without any early repayment charges.
- If you plan to apply for a market leading personal loan, it’s crucial that you check your credit rating first. Lenders are only required to offer their advertised 'typical' APRs to two-thirds of applicants. Therefore, if your credit rating is not in good shape, you may be offered a more expensive deal than the low rate loan you originally applied for.
- In general, the larger the loan the lower the interest rate. Due to the way some providers price their loans, there are occasions where you can actually save money by borrowing slightly more. Make sure that you will not be paying exponentially more in the long run, so in some cases, it may be beneficial to take out a little bit more in your loan.
- Don’t apply for too many loans. When you apply for a loan online, most applicants will leave a “footprint” on your credit record which lenders check before approving a loan. Having lots of applications on your record makes you look desperate or in financial difficulties. As a result lenders will see you as more of a credit risk, so your latest loan application is less likely to be approved.
- Secured loans are cheaper than unsecured loans but you run the risk of losing your home if you don’t keep up repayments. Secured loans are only offered to homeowners with equity in their property and mean the lender effectively takes a charge on your property. So don’t sign-up unless you’re 100 per cent sure that you will be able to meet your repayments – this type of loan is basically less risky for lenders but more risky for borrowers.

### Unsecured vs. Secured Loans

Secured loans are loans that are backed by an asset, like a house in the case of a mortgage loan or a car with an auto loan. This piece of property is collateral for the loan. When you agree to the loan, you agree that the lender can repossess the collateral if you don't repay the loan as agreed. People sometimes choose secured loans because their credit history will not allow them to get approved for an unsecured loan. Because secured loans are backed by assets, lenders have lower risk in extending a loan to you.

Unsecured loans, also called personal loans or signature loans, involve borrowing money without putting up any collateral. Because there is no home or car to repossess if you don't make your payments, unsecured loans are considerably riskier for lenders. Extra risk means lenders must charge higher interest rates and require higher credit scores. Unsecured loans involve much less paperwork than secured loans like mortgages. The terms are generally shorter, from two weeks to five years, and loan amounts are usually smaller.

### Comparing Wells Fargo & Home State Bank:

Wells Fargo:

Amount of Loan- \$10,000

Unsecured Personal Loan

Term- 24 Months

APR- 7.25%

Monthly Payment- \$448.86

Secured Personal Loan

Term- 24 months

APR- 7.73%

Monthly Payment- \$451.04

Home State Bank:

Amount of Loan- \$10,000

Unsecured Personal Loan

Term- 24 Months

APR- 6.25%

Monthly Payment- \$444.33

Secured Personal Loan

Term- 24 months

APR- 6.73%

Monthly Payment- \$446.50

### Problems/Questions:

1. Easy: How much more in interest is one paying over the term compared to the initial borrowed amount?

Wells Fargo

Unsecured

$\$448.868 \times 24 = \$10,772.64$

$\$10,772.64 - 10,000 = \$772.64$  in interest over 2 years

Secured

$\$451.04 \times 24 = \$10,824.96$

$10,824.96 - 10,000 = \$824.96$  in interest over 2 years

Home State Bank

Unsecured

$\$444.33 \times 24 = \$10,663.92$

$\$10,663.92 - 10,000 = \$663.92$  in interest over 2 years

Secured

$\$446.50 \times 24 = \$10,716$

$10,716 - 10,000 = \$716$  in interest over 2 years

Medium:

2.

What is the monthly payment amount on a loan when comparing the two companies?  $P = \frac{iA}{1 - (1+i)^{-n}}$

Wells Fargo

Unsecured

$P = \frac{60.416}{1 - (1.0060416667)^{-24}} = \$448.86$  per month

Secured

$P = \frac{64.416666667}{1 - (1.0064)^{-24}} = \$451.04$  per month

Home State Bank

Unsecured

$$P = \frac{52.08333333}{1-(1.0053)^{-24}} = \$444.33 \text{ per month}$$

Secured

$$P = \frac{56.08333333}{1-(1.0053)^{-24}} = \$446.50 \text{ per month}$$

3. If you get a loan for 10,000, what is your interest rate equal to if you pay 13,000 after 5 years of paying off the loan?

r=5.25%

4. What is the loan balance after 16 payments have been made? You initially take out \$10,000 and have an interest rate of 6.25% and pay \$444.33 each month (Information from unsecured Home State Bank loans)

$$B = 10,000(1+.004375)^{16} - \frac{444.33}{.004375} [(1+.004375)^{16} - 1]$$

B = 3376.06 of loan balance

5. Difficult: After n payments, you have paid off 10,000 dollars, and you started at 30,000. If your interest rate is 7% and it is compounded monthly, how many payments have you already made?

$$B = A(1+i)^n - \frac{P}{i} [(1+i)^n - 1]$$

$$20,000 = 30,000(1+.005833333)^n - \frac{600}{.005833333} [(1+.005833333)^n - 1]$$

N rounded= 22 payments

1,777.32	1,786.00	1,795.44	1,804.04
3,554.64	3,572.00	3,589.88	3,608.08
5,331.96	5,358.00	5,386.32	5,412.48
7,109.28	7,144.00	7,181.76	7,216.64
8,886.60	8,930.00	8,977.20	9,020.80
10,663.92	10,716.00	10,772.64	10,824.96