

## Worksheet Finance 4: Loans

## Useful Formulas

$$P = \frac{d(1 - (1 + \frac{r}{n})^{-nt})}{(\frac{r}{n})}$$

$$d = \frac{P(\frac{r}{n})}{(1 - (1 + \frac{r}{n})^{-nt})}$$

Suppose AJ wants to buy a car that costs \$16,000. AJ saved \$3,000 but plans to finance the rest using either a 3-year loan at 3% APR or a 5-year loan at 4.5% APR. Assume there is monthly compounding.

We want to help AJ determine the monthly payments in each case and objectively compare the two options.

- ① Circle the formula you will need to determine the monthly payments.
2. Use a spreadsheet to determine AJ's monthly payments for both the 3-year and the 5-year loan. (Suggested set up is on the back.)

## Monthly Payment

3-year loan: \$378.06 per month

5-year loan: \$242.36 per month

3. Determine how much AJ will actually pay for the car in each scenario. (Write your calculation.)

## Total Cost of Car

3-year : \$3000 + \$378.06(12)(3) = \$16,610.01

5-year : \$3000 + \$242.36(12)(5) = \$17,541.56 ← \$931.55 more

4. Explain to AJ what are the benefits and drawbacks of each scenario.

The 3-year loan has higher monthly payments. So it takes a larger portion of your budget. But it costs less in the end.

The 5-year loan has smaller monthly payments but cost over \$900 more in the end.

	A	B	C	D	E	F
1		loan amount	APR (decimal)	compounding times per year	length of loan (years)	loan payment each period
2		P	r	n	t	d
3	3-year loan					
4						
5	5 year loan					
6						