

3.1 Simple Interest

- Goals:
- ① Understand and apply the simple interest formula
 - ② Solve problems using this formula

Simple Interest Formula

$$I = P \cdot R \cdot t$$

I : interest earned or to be paid
 P : Principal (amount invested)

R : interest rate (as a decimal)

t : time (in years)

E.g. Borrow \$100. Simple Interest. Rate is 5%
3 years. Find the total interest to be paid

$$(0.05) \cdot (\$100) = \$5 \quad \leftarrow \text{interest for 1 year}$$

$$\$5 \cdot 3 = \$15 \quad \leftarrow \text{total interest for 3 years}$$

$$I = P \cdot R \cdot t = \$100 \cdot (0.05) \cdot 3 = \$15$$

E.g. (HW #2)

Use the formula for simple interest to find the indicated quantity.

$$I = P \cdot R \cdot t$$

$$I = \$100 ; R = 10\% ; t = 6 \text{ months}$$

$$P = ?$$

$$100 = P (0.1) \cdot \frac{6}{12}$$

$$100 = P \cdot \underbrace{(0.1) \cdot (0.5)}_{0.05}$$

$$100 = P \cdot 0.05$$

$$P = \frac{100}{0.05} = 2000$$

E.g. $P: \$100$; $R = 5\% = 0.05$. 3 years

Total amount to be paid back.

= Principal + Interest

$$= \$100 + \$15 = \$115$$

Future Value.

Future Value Formula.

$$A = P + I$$

$$= P + P R \cdot t$$

$$= P (1 + R t)$$

$$A = P (1 + R t)$$

↘ Future Value

Future value
Formula

HW #7

$$P = \$5100$$

$$A = \$5227.5$$

$$t = 3 \text{ months}$$

$$R = ?$$

$$\rightarrow 0.25$$

$$A = P(1 + Rt)$$

$$\frac{A}{P} = 1 + Rt$$

$$\frac{A}{P} - 1 = Rt$$

$$\frac{\frac{A}{P} - 1}{t} = R$$

$A = P(1 + Rt)$. Solve for R ?

$$A = P + PRt$$

$$A - P = PRt$$

$$R = \frac{A - P}{Pt} = \frac{5227.5 - 5100}{5100(0.25)}$$

HW #14

Commercial for loan company:

You only need to pay 24 cents (\$0.24)
for \$500 borrowed.

You borrow \$1,225 for 118 days

- (a) What amount will you need to repay?
- (b) What annual interest rate they are actually charging?

(a) Interest Per day :

$$\frac{\$1225}{\$500} \cdot (0.24) = 0.588$$

Interest for 118 days

$$(0.588)(118) = 69.38$$

$$\text{Repay amount} = 1225 + 69.38 = 1294.38$$

(b) $I = Prt$ $R = \frac{I}{Pt} = \frac{69.38}{1225 \cdot (0.32)}$
 $= 0.177 \rightarrow \boxed{17.7\%}$