

3.1. Simple Interest.

Tuesday, September 5, 2017 9:26 AM

Goals: (1) Understand and Apply the Simple Interest Formula
(2) Solve some problems using this formula.

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

I : interest earned or to be paid

P : Principal (amount invested)

R : interest rate (as decimals)

t : time (in years)

E.g. Borrow \$100. Simple Interest. Annual interest Rate 5%
Pay back in 3 years.

Q: Find the total interest to be paid.

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

E.g. $I = P \cdot R \cdot t$

I \$100.

$= 10\%$

$t = 6$ months

Find P ?

$R = 0.1$

$t = 0.5$ years

$$100 = P \cdot (0.1) \cdot (0.5)$$

$$100 = P \cdot (0.05) \rightarrow \frac{100}{0.05} = P$$

$$P = \$2000$$

E.g. $P = \$100$, $R = 5\% = 0.05$, $t = 3$ years.

Total amount to be paid back?

= Principal + Interest

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

Future Value.

Formula for Future Value:

$$A = P + I$$

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

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

Future Value

E.g. $P = \$5100$
 $A = \$5227.5$
 $t = 3$ months
 $t = 0.25$

} Find $R = ?$

$$A = P(1 + R \cdot t) \quad \left| \quad \frac{A}{P} - 1 = R \cdot t \right.$$

$$\begin{array}{l|l}
 \boxed{A = P(1 + Rt)} & \frac{A}{P} - 1 = R \cdot t \\
 \frac{A}{P} = 1 + Rt & \frac{\frac{A}{P} - 1}{t} = R \\
 \hline
 5227.5 = 5100(1 + R \cdot 0.25) & \frac{\frac{5227.5}{5100} - 1}{0.25} = R \\
 & \frac{0.025}{0.25} = R \\
 & R = 0.1 \rightarrow 10\%
 \end{array}$$

Commercial for a loan company

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

You borrow \$1,225 for 118 days.

- ① What is the amount that you need to repay?
- ② What annual interest rate they are actually charging?

$$① \frac{1225}{500} \cdot (0.24) \cdot (118) = \$69.38 \leftarrow \text{interest}$$

$$I_{\text{total}}: 1225 + 69.38 = \$1294.38$$

$$② I = P \cdot R \cdot t \quad \text{Want } R? \quad \frac{118}{365} \approx 0.32$$

$$69.38 = 1225 \cdot R \cdot (0.32) = 392R$$

$$R = \frac{69.38}{392} \approx 17.7\%$$

$$R = \frac{69.38}{392} \approx \boxed{17.7\%}$$