

## Warm up

15. At last night's baseball game, Sandeep and Andre both sold hot dogs. Sandeep gets paid a commission of 20% of sales. Andre earns \$30 per game plus a 15% commission. Show calculations to support your answers to the following:

a) Sandeep  
 $= \$500 \times 0.20$   
 $= \$100$

Andre  
 $= 500 \times 0.15 + 30$   
 $= 75 + 30$   
 $= \$105$

$\Rightarrow$  Andre earned more

a) Who earned more money if they both sold \$500 in hot dogs?

b) Who earned more money if they both sold \$700 in hot dogs?

c) For which amount of total sales would Sandeep and Andre earn the same amount of money?

b) Sandeep  
 $= 700 \times 0.20$   
 $= \$140$

Andre  
 $= 700 \times 0.15 + 30$   
 $= 105 + 30$   
 $= \$135$

$\Rightarrow$  Sandeep earned more

\$600

# Calculating Simple Interest

### simple interest

- amount earned for money borrowed or lent
- usually expressed as a percent per year

### principal

- money invested or borrowed

Suppose you receive a grade 8 graduation present of \$200. You decide to deposit the money into a bank account until you finish high school, in 4 years. How much will be in the account when you graduate?

Suppose the bank pays 6% per year

**simple interest**.

1. The interest is paid every year for 4 years. Without calculating, estimate how much the \$200 deposit will amount to, with interest, at the end of 4 years.

$$\begin{aligned} \$200 \times 0.06 \\ = \$12 \text{ a year} \end{aligned}$$

2. Find the amount of interest the \$200 would earn after each time.

a) 1 year      b) 2 years      c) 3 years      d) 4 years

\$12      \$24      \$36      \$48

3. a) How much does the \$200 amount to when you graduate from high school?  
b) Compare this to your estimate in step 1.

Amount = Principal + Interest

$$A = P + I$$

$$A = 200 + 48$$

$$A = \$248$$

4. **Reflect** What math operations are involved in step 2? Is there a faster way to find the total amount of interest? Explain your answer using words or symbols.

$$I = P \times r \times t$$

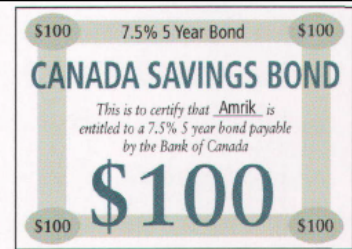
Interest      Principal      interest rate ÷ by 100      time in years

[start amount]

**Example 1: Calculate Simple Interest**

Amrik buys a \$100 Canada Savings Bond that pays  $7\frac{1}{2}\%$  per year simple interest. Amrik can cash the bond in 5 years, when it matures.

- a) How much interest will the bond earn in 5 years?  
b) What will the total value of the bond be in 5 years?



$$\begin{aligned} \text{a) } I &= P \times r \times t \\ I &= 100 \times 0.075 \times 5 \\ I &= \$37.50 \end{aligned}$$

$$\begin{aligned} \text{b) } A &= P + I \\ A &= 100 + 37.50 \\ A &= \$137.50 \end{aligned}$$

**Example 2: Calculate Simple Interest for Less Than One Year**

Sue borrows \$300 from her sister Darma. Sue agrees to pay 8% interest per year. If Sue repays the loan 6 months later, how much does she owe Darma?

$$\begin{aligned} \text{a) } I &= P \times r \times t \\ I &= 300 \times 0.08 \times 0.5 \\ I &= \$12 \end{aligned}$$

$$\begin{aligned} \text{b) } A &= P + I \\ A &= 300 + 12 \\ A &= \$312 \end{aligned}$$

$$\begin{aligned} \text{Time} &= 6 \text{ months} \\ &= \frac{6}{12} \text{ a year} \\ &= 6 \div 12 \\ &= 0.5 \end{aligned}$$

## Key Ideas

- Simple interest is calculated when money is borrowed or lent.

- The formula for simple interest is  $I = P \times r \times t$ , where

$I$  is the interest, in dollars  
 $P$  is the principal, in dollars  
 $r$  is the interest rate per year, in decimal form  
 $t$  is the time, in years

- The total amount is found by adding the interest to the principal.

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