GRADE 7 · UNIT 7 · LESSON 8

Simple Interest

MA.7.AR.3.1

I can use I = Prt to find simple interest and the balance, and find the principal, the rate or the time when I know the other three.

Warm-Up

1. A $40 shirt is 25% off, then 6% tax is added. What do you pay?
2. A meal costs $60. What is an 18% tip?
3. A plan shows a wall 7 in. long at 1 in. : 3 ft. How long is the wall?
4. Write 4.5% as a decimal.

Warm-Up

1. A $40 shirt is 25% off, then 6% tax is added. What do you pay?

   $31.80

2. A meal costs $60. What is an 18% tip? **$10.80**

3. A plan shows a wall 7 in. long at 1 in. : 3 ft. How long is the wall?

   21 ft

4. Write 4.5% as a decimal. **0.045**

Vocabulary

principal

the money saved or borrowed at the start: P

interest rate

the percent of the principal paid as interest each year: r, written as a decimal in the formula

simple interest

interest on the principal alone, the same amount every year: I = Prt, with t in years

balance

the principal plus the interest: what is in the account, or what is owed

Notes

I. Interest and balance

Simple interest: $I = Prt$

P is the principal, r the yearly rate as a decimal, t the time in years.

$800 is saved at 3% simple interest per year for 4 years.

Interest: $I = 800 \cdot 0.03 \cdot 4 = 96$

Balance: $800 + 96 = 896$

It earns $96, and the balance is $896.

Notes

II. Time is in years

Months	Months ÷ 12	t (years)
6	6 ÷ 12	0.5
3	3 ÷ 12	0.25
18	18 ÷ 12	1.5

\$600 at 4% per year for 18 months: $I = 600 \cdot 0.04 \cdot 1.5 = 36$

Notes

III. Find P, r or t: one equation

$750 at 2% simple interest per year earns $45. How many years?

Substitute: $45 = 750 \cdot 0.02 \cdot t$

Multiply: $45 = 15t$

Divide: $t = 45 \div 15 = 3$, so 3 years.

Example 1

Use $I = Prt$.

Dev borrows $2,000 at 4.5% simple interest per year for 3 years.

How much interest does he pay? How much does he owe in all?

Example 1

$$I = 2{,}000 \cdot 0.045 \cdot 3 = 270$$

$$2{,}000 + 270 = 2{,}270$$

Answer: Interest $270; he owes $2,270

Your Turn

Use $I = Prt$.

Kia borrows $3,000 at 5.5% simple interest per year for 2 years.

How much interest does she pay? How much does she owe in all?

Your Turn

Use $I = Prt$.

Kia borrows $3,000 at 5.5% simple interest per year for 2 years.

How much interest does she pay? How much does she owe in all?

Interest: $3{,}000 \cdot 0.055 \cdot 2 = 330$

Owed: $3{,}000 + 330 = 3{,}330$

Answer: Interest $330; she owes $3,330

Example 2

Use $I = Prt$.

Ana saves $500 and earns $60 in simple interest in 4 years.

What is the interest rate per year?

Example 2

$$60 = 500 \cdot r \cdot 4$$

$$60 = 2{,}000r$$

$$r = 60 \div 2{,}000 = 0.03$$

$$0.03 \cdot 100 = 3$$

Answer: 3% per year

Your Turn

Use $I = Prt$.

Leo saves $400 and earns $42 in simple interest in 3 years.

What is the interest rate per year?

Your Turn

Use $I = Prt$.

Leo saves \$400 and earns \$42 in simple interest in 3 years.

What is the interest rate per year?

Substitute: $42 = 400 \cdot r \cdot 3$, so $42 = 1{,}200r$

Divide: $r = 42 \div 1{,}200 = 0.035$

As a percent: $0.035 \cdot 100 = 3.5$

Answer: 3.5% per year

Whiteboards · Question 1 of 9

Use $I = Prt$.

Mia saves $1,500 at 6% simple interest per year for 2 years.

How much interest does she earn?

Answer it.

Whiteboards · Question 1 of 9

Use $I = Prt$.

Mia saves $1,500 at 6% simple interest per year for 2 years.

How much interest does she earn?

$$\text{Interest: } 1{,}500 \cdot 0.06 \cdot 2 = 180$$

Answer: $180

Whiteboards · Question 2 of 9

Use $I = Prt$.

Ben borrows $900 at 7% simple interest per year for 3 years.

How much does he owe in all?

Answer it.

Whiteboards · Question 2 of 9

Use $I = Prt$.

Ben borrows $900 at 7% simple interest per year for 3 years.

How much does he owe in all?

$$\text{Interest: } 900 \cdot 0.07 \cdot 3 = 189$$

$$\text{Owed: } 900 + 189 = 1{,}089$$

Answer: $1,089

Whiteboards · Question 3 of 9

Use $I = Prt$.

Zoe saves $2,400 at 5% simple interest per year for 9 months.

What is her balance after 9 months?

A. $2,490

B. $11,400

C. $90

D. $3,480

Answer it.

Whiteboards · Question 3 of 9

Use $I = Prt$.

Zoe saves $2,400 at 5% simple interest per year for 9 months.

What is her balance after 9 months?

Time in years: $9 \div 12 = 0.75$

Interest: $2{,}400 \cdot 0.05 \cdot 0.75 = 90$

Balance: $2{,}400 + 90 = 2{,}490$

Answer: A — $2,490

Whiteboards · Question 4 of 9

Use $I = Prt$.

An account pays 5% simple interest per year, and $700 in it earns $140.

How many years did it take?

Answer it.

Whiteboards · Question 4 of 9

Use $I = Prt$.

An account pays 5% simple interest per year, and \$700 in it earns \$140.

How many years did it take?

Substitute: $140 = 700 \cdot 0.05 \cdot t$, so $140 = 35t$

Divide: $t = 140 \div 35 = 4$

Answer: 4 years

Whiteboards · Question 5 of 9

Use $I = Prt$.

An account pays 4% simple interest per year and earns $54 in 3 years.

How much was put in the account?

A. $4.50

B. $6.48

C. $450

D. $1,350

Answer it.

Whiteboards · Question 5 of 9

Use $I = Prt$.

An account pays 4% simple interest per year and earns $54 in 3 years.

How much was put in the account?

Substitute: $54 = P \cdot 0.04 \cdot 3$, so $54 = 0.12P$

Divide: $P = 54 \div 0.12 = 450$

Answer: C — $450

Whiteboards · Question 6 of 9

Use $I = Prt$.

Eli saves $1,600 and earns $200 in simple interest in 5 years.

What is the interest rate per year?

A. 12.5%

B. 2.5%

C. 0.025%

D. 25%

Answer it.

Whiteboards · Question 6 of 9

Use $I = Prt$.

Eli saves \$1,600 and earns \$200 in simple interest in 5 years.

What is the interest rate per year?

Substitute: $200 = 1{,}600 \cdot r \cdot 5$, so $200 = 8{,}000r$

Divide: $r = 200 \div 8{,}000 = 0.025$

As a percent: $0.025 \cdot 100 = 2.5$

Answer: B — 2.5%

Whiteboards · Question 7 of 9

Use $I = Prt$. Loan A: $1,200 at 5% per year for 2 years.

Loan B: $1,200 at 3.5% per year for 3 years.

Which loan costs more interest, and how much more?

Answer it.

Whiteboards · Question 7 of 9

Use $I = Prt$. Loan A: \$1,200 at 5% per year for 2 years.

Loan B: \$1,200 at 3.5% per year for 3 years.

Which loan costs more interest, and how much more?

Loan A's interest: $1{,}200 \cdot 0.05 \cdot 2 = 120$

Loan B's interest: $1{,}200 \cdot 0.035 \cdot 3 = 126$

$126 - 120 = 6$

Answer: Loan B, by \$6

Whiteboards · Question 8 of 9

Use $I = Prt$.

Sam puts $350 of his $520 in savings at 6% simple interest per year for 3 years.

How much interest does he earn?

Answer it.

Whiteboards · Question 8 of 9

Use $I = Prt$.

Sam puts $350 of his $520 in savings at 6% simple interest per year for 3 years.

How much interest does he earn?

The principal is the $350 he puts in.

Interest: $350 \cdot 0.06 \cdot 3 = 63$

Answer: $63

Whiteboards · Question 9 of 9

Use $I = Prt$. Kim's $1,000 earns 3% simple interest per year.

Why does she earn the same interest every year? How much is it?

Write your answer in sentences.

Whiteboards · Question 9 of 9

Use $I = Prt$. Kim's $1,000 earns 3% simple interest per year.

Why does she earn the same interest every year? How much is it?

P and r never change; each year adds 1 to t.

One year's interest: $1{,}000 \cdot 0.03 \cdot 1 = 30$

Answer: P and r stay the same: $30 a year

Independent Practice

1. Use $I = Prt$. Find the simple interest on \$2,500 at 3% per year for 4 years.
2. Use $I = Prt$. \$650 is saved at 8% simple interest per year for 2 years. What is the balance?
3. Use $I = Prt$. Find the simple interest on \$3,200 at 6% per year for 3 months.
4. Use $I = Prt$. \$1,100 at 4% simple interest per year earns \$220. How many years?
5. Use $I = Prt$. An account at 5% simple interest per year earns \$85 in 2 years. What is the principal?
6. Use $I = Prt$. \$1,400 earns \$126 in simple interest in 2 years. What is the rate per year?

Before You Go

$I = Prt$: the rate as a decimal, the time in years.

The balance is the principal plus the interest.

Tomorrow: percent increase and decrease.

IXL

1. Open IXL and start today's skills.
2. Work on paper where the question needs work. The answer box does not show it.
3. Every skill listed is required, to a SmartScore of 60. Due by the Unit 7 test.

Today's skills — all required

Simple interest (E7Y)