

Lesson 8

Interest

Objectives

In this lesson you will:

- ✓ Calculate simple interest for a loan.



The cost of credit is affected by the interest rate, loan term, and fees. You will learn about loan terms and fees in the next lesson. Borrowers pay **interest** for their credit. The amount of interest they pay is based on the annual percentage rate or APR. The higher the APR, the more they pay to use credit. There are two basic kinds of interest: (a) simple interest, and (b) compound interest. **Simple interest** is applied only to the principal amount. **Compound interest** is applied to the principal *plus* accruing interest.

Imagine that you borrowed \$100 at 9% interest. If you repaid it in full at the end of 5 years, you would pay the following in interest. Notice how the compound interest builds more quickly than the simple interest does.

Simple Interest			
Year	Principal (\$)	Interest (\$)	Ending Balance (\$)
1	100.00	9.00	109.00
2	100.00	9.00	118.00
3	100.00	9.00	127.00
4	100.00	9.00	136.00
5	100.00	9.00	145.00
Total Interest Paid		\$45.00	

Compound Interest			
Year	Principal (\$)	Interest (\$)	Ending Balance (\$)
1	100.00	9.00	109.00
2	109.00	9.81	118.81
3	118.81	10.69	129.50
4	129.50	11.66	141.16
5	141.16	12.70	153.86
Total Interest Paid		\$53.86	

Calculating Simple Interest

To calculate simple interest, multiply the principal amount by the interest rate by the amount of time. This formula is $Interest = Principal \times Rate \times Time$. We can use this formula only for loans that are repaid all at once. These loans are repaid at the end of a period of time. We would calculate interest differently for a loan that was repaid over time on a payment plan. We will look at 2 examples to practice the formula, as it is very rare that you would get a loan at simple interest.

Example 1

Habib borrowed \$2,500 at 8.5% interest. He paid it all back 4 years later. How much did he pay in interest?

Solution

First convert the percentage to a decimal.

8.5% = 0.085 (**Remember**—to change from a percent to a decimal move the decimal point 2 places to the left.)

Now use the formula to find the interest.

Interest = principal x rate x time

\$2500 — principal
X 0.085 — interest rate
\$212.50

\$212.50

X 4 — time

\$850.00 — Habib will pay \$850 in interest.

To simplify, we can use parentheses to show the same steps in multiplication.

Interest = (\$2,500)(0.085)(4)
(\$212.50)(4)
\$850.00

Example 2

Luiz borrowed \$360 for one month at a yearly rate of interest of 7.5%. How much interest did he have to pay?

Solution

First remember the formula: $Interest = Principal \times Rate \times Time$

Next identify the parts:

Principal = \$360

Rate = 7.5% — to use it we need to change it into a decimal — .075

Time = 1 month (since our interest rate is given as a yearly rate, we need to write it as part of a year) or $\frac{1}{12}$.

We now have: $Interest = 360 \times .075 \times \frac{1}{12}$

$$\begin{array}{r} \$360 \\ \times .075 \\ \hline \$27.00 \end{array}$$

Remember from elementary school that multiplying by $\frac{1}{12}$ is the same as dividing by 12.

$$\frac{\$27.00}{12} = \$2.25$$

Luiz must pay \$2.25 interest on the loan.



Find the amount paid in interest.

1. Amy borrowed \$4,000 at 7% interest. She paid it all back 3 years later.
2. Juanita borrowed \$1,000 at 10% interest. She paid it all back 1 year later.
3. Ramiro borrowed \$5,500 at 9.5% interest. He paid it all back 3 years later.
4. Nate borrowed \$2250. He paid it all back 1 year later. He paid \$405 in interest, so what was the interest rate?
5. Kyoko borrowed \$6,000 at 6.7% interest. She paid it all back 1 month later.

Example 3

Philip borrowed \$3,000 at 7.2% interest. He paid it all back 3 years later. How much did he pay total?

Solution

First convert the percentage to a decimal.

$$7.2\% = 0.072$$

Use the formula to find the interest.

Interest = principal x rate x time

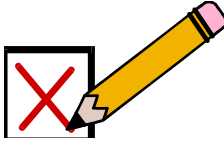
$$\begin{aligned} \text{Interest} &= (\$3,000)(0.072)(3) \\ &= (\$216)(3) \\ &= \$648 \end{aligned}$$

Finally, add the interest to the principal.

$$\begin{array}{r} \$3000 \text{ — principal amount} \\ + \underline{\$648} \text{ — interest} \\ \$3,648 \end{array}$$

Philip paid \$3,648 total.

These are for practice with the formula only. This method of paying interest on a loan is very rare.



Review

1. Why do you have to pay interest when you borrow money? Provide an example of when you would need to pay interest.

2. Which type of interest builds more quickly with time: simple or compound interest?

3. Write one new thing that you learned from this lesson or one question that you would like to ask your mentor.



Practice Problems

Directions: Write your answers in your math notebook. Label this exercise Unit 3 — Lesson 8, Set A and Set B.

Set A

Find the amount of interest paid.

1. Wade borrowed \$1,000 at 15% interest. He paid it all back 1 year later.
2. Rosa borrowed \$850 at 10% interest. She paid it all back 2 years later.
3. Kim borrowed \$7,000 at 7.2% interest. She paid it all back 3 years later.

4. Yi Min borrowed \$2,400 at 9% interest. He paid it all back 1 year later.
5. Alex borrowed \$4,300. She paid it all back 1 year later for \$4622.50. Find the interest rate.
6. Consuela borrowed \$3,800 at 13% interest. She paid it all back 2 years later.

Set B

Find the total amount paid.

1. Talisha borrowed \$5,100 at 9% interest. She paid it all back 3 years later.
2. Ramon borrowed \$1,800 at 12% interest. He paid it all back 1 year later.
3. Adam borrowed \$4,400 at 8.2% interest. He paid it all back 3 years later.
4. Vanessa borrowed \$1,300 at 9.6% interest. She paid it all back 1 year later.
5. Samuel borrowed \$3,500 at 14% interest. He paid it all back 2 years later.
6. Danika borrowed \$2,750 at 7.1% interest. She paid it all back 2 years later.



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|---------------|----------------|
| 1. \$840 | 6. \$6,500 |
| 2. \$100 | 7. \$1,680 |
| 3. \$1,567.50 | 8. \$5,120.90 |
| 4. 18% | 9. \$1,102 |
| 5. \$33.50 | 10. \$4,168.80 |



End of Lesson 8