Percent: Simple Interest—Explanation & Practice

When a customer deposits money in a savings account, the bank pays the customer for the use of the money. This payment is call **interest**. Likewise, a customer who borrows money must pay interest to the bank. The formula I = prt is used to find *simple interest*, or interest on a specific amount at a fixed rate.

The formula for simple interest is	
I = prt, where $I = $ interest, $p = $ principal, r = rate, and $t = $ time	The rate

time must have corresponding units. That is, if the rate is given per year, the time must be in years. When using the formula, express the rate, r, as a decimal or a fraction. For example, express 4.5% as 0.045 or 45/1000.

EXAMPLE 1

The principal is \$1200, the rate is 7% per year, and the time is 6 months. What is the amount of interest?

Change 6 months to $\frac{1}{2}$ or 0.5 year. Also, write 7% as 0.07. I = prtI = (\$1200)(0.07)(0.5)I = \$42The interest is **\$42**.

EXAMPLE 2

What is the interest on \$2500 principal, at the interest rate of 8% a year?

I = prt $I = 2500 \times 8\% \times 1$ $I = 2500 \times .08$ I = 200So the interest is \$200.

EXAMPLE 3

What is the interest on \$2500 principal, at the interest rate of 7% for ¹/₄ year?

I = prt $I = 2500 \times 7\% \times \frac{1}{4}$ $I = 2500 \times .07 \times \frac{1}{4}$ $I = 175 \times \frac{1}{4}$ $I = \frac{175}{4} = 43.75$ So the interest is \$43.75. We often borrow money for 30, 60, or 90 days even though the interest rate is *per year*. To simplify calculations, business people consider 360 days a year. So if a loan was for 30 days, it would be for 30/360 of a year.

EXAMPLE 4

What is the interest on \$400 at 8% for 30 days? I = prt $I = 400 \times 8\% \times \frac{30}{360}$ $\left(\frac{30}{360} = \frac{1}{12}\right)$ $I = 400 \times .08 \times \frac{1}{12}$ $I = 32 \times \frac{1}{12}$ $I = \frac{32}{12} = 2.66$ So the interest is \$2.67. Next we consider how computations are made on an installment purchase.

EXAMPLE 5

Suppose you owe \$17,980.00 on a loan you obtained to buy a car. You agree to a payment of \$165 a month. What would the new principal be after one month? The interest rate is 6%.

a) First compute the interest:

$$I = 17,980 \times 6\% \times \frac{30}{360}$$

 $I = 17,980 \times .06 \times \frac{1}{12}$
 $I = 1078.8 \times \frac{1}{12}$
 $I = \frac{1078.8}{12} = 89.90$
So the interest is \$89.90.

b) The new principal is the old principal minus the part of the monthly payment that was not for interest. New Principal = Original Principle – (Monthly Payment – Interest) New Principal = \$17,980.00 - (\$165.00 - \$89.90)= \$17,980.00 - \$75.10 = \$17,904.90 Do you see why it takes so long to pay off a car loan?

PRACTICE Find the amount of interest. Assume the interest rate is yearly.

- 1. \$225 at 4% for 1 year 5. \$2500 at 61/2% for 2 years
- 2. \$300 at 5% for 2 years

6. \$1000 at 51/2% for 1 year

3. \$350 at 9% for 9 months

- 7. \$225 at 8% for 3 months
- 4. \$1000 at 6¹/₂% for 1 year and 3 months
- 8. \$450 at 10¼% for 3 years and 9 months

- 9. What is the interest on \$4300 principal, at the interest rate of 7% for 1 year?
- 11. What is the interest on \$4800 at 7% for 60 days?
- 10. What is the interest on \$4300 principal, at the interest rate of 8% for ¹/₂ year?
- 12. Suppose you owe \$9,860 on a loan obtained to buy your car. You agree to a payment of \$120 a month. The interest rate is 8%. What would the new principal be after one monthly payment?

Solutions: (decimal and fraction)

1. $I = prt$ =(\$225)(.04)(1) = \$ 9	I = prt = $\frac{\$225}{1} \cdot \frac{4}{100} \cdot \frac{1}{1}$ = $\frac{225}{1} \cdot \frac{1}{25} = \frac{225}{25} = 9$	5. <i>I</i> = <i>prt</i> =(\$2500)(.065)(2) = \$ 325	I = prt = $\frac{2500}{1} \cdot \frac{13}{200} \cdot \frac{2}{1}$ = $\frac{65000}{200} = 325$
2. I = prt =(\$300)(.05)(2) = \$ 30	$I = prt = \frac{300}{1} \cdot \frac{5}{100} \cdot \frac{2}{1} = \frac{3000}{100} = 30$	6. I = prt = (\$1000)(.055)(1) = \$55	I = prt = $\frac{1000}{1} \cdot \frac{55}{1000} \cdot \frac{1}{1}$ = 55
3. $I = prt$ =(\$350)(.09)(.75) time = 9 months \rightarrow years $\left(\frac{9}{12} = .75 years\right)$ = \$23.625 probably would be rounded down if it is money to be paid to you. \approx \$23.62	I = prt = $\frac{350}{1} \cdot \frac{9}{100} \cdot \frac{3}{4}$ = $\frac{9450}{400} = 23.625$ $\approx 23.62	7. $I = prt$ = (\$225)(.08)(.25) time = 3 months \rightarrow years $\left(\frac{3}{12} = .25 years\right)$ = \$4.50	$I = prt = \frac{225}{1} \cdot \frac{8}{100} \cdot \frac{1}{4} = \frac{1800}{400} = 4.5$
4. $I = prt$ = (\$1000)(.065)(1.25) time = 1 yr 3 months \rightarrow years 1 yr and $\left(\frac{3}{12} = .25\right) \rightarrow 1.25$ years = \$81.25	I = prt = $\frac{1000}{1} \cdot \frac{13}{200} \cdot \frac{5}{4}$ = $\frac{65000}{800} = \$81.25$	8. $I = prt$ = (\$450)(1.025)(3.75) time = 3 years 9months \rightarrow years = \$172.96875 round up = \$172.97	I = prt = $\frac{450}{1} \cdot \frac{41}{400} \cdot \frac{15}{4}$ = $\frac{276750}{1600} = 172.96875$ $\approx 172.97

Answers:	9.	\$301
	10.	\$172
	11.	\$56
	12.	\$9,805.73

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