

**INTEREST, DISCOUNT,
EQUATION OF PAYMENTS,
&C.; WITH NUMEROUS
PROBLEMS FOR SOLUTION**

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BY

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PREFACE.

THIS treatise illustrates the principles involved in Interest, Equation of Payments, &c., and exhibits such methods of applying them as seem most brief and expeditious, and best adapted to the wants and circumstances of business men.

A large number of problems are inserted in order to furnish the student in school with material for practice. They are of such a character as to exhibit the nature of the most common transactions involving interest and percentage, and to require such computations as the accountant is most frequently called on to perform. Many of them cannot be solved without considerable labor; but they are not more difficult than those of a similar nature which come up in real life, and which any one fitting for business pursuits should be able to master.

As a general thing, answers to the problems are not inserted. They are omitted for the following and other reasons.

1. They are unnecessary, since every example admits of rigid proof.
2. They are never given in the problems of real life.
3. A learner should become practically acquainted with those tests which alone he can apply when acting for himself; for then it will be as important for him to be sure of the truth of his results as it will be to obtain them.

4. The proof will often make an operation appear plain and simple which would otherwise have seemed obscure and complicated.

5. The proof often furnishes as valuable an arithmetical exercise as did the original solution.

6. The necessity of verifying his work for himself will lead the pupil to be more careful and accurate in performing it.

In short, it has been the aim of the author to make this treatise in every respect a practical one, and he now submits it to the public with the hope that it may be found worthy of some degree of patronage.

INTEREST, EQUATION OF PAYMENTS, &c.

§ 1. INTRODUCTORY.

WHEN a person hires an article of property of another, it is evident that, at the expiration of the time for which he hires it, he ought to return it, and pay for its use. Moreover the sum paid for the use of the borrowed article should be proportioned both to its value, and the length of time it is kept.

For instance, if I hire two houses, one of which is worth twice as much as the other, I ought to pay twice as much per year for the first as for the second. If the values of the houses are alike, and one is kept one half as long as the other, only one half as much ought to be paid for the first as for the second.

TO THE TEACHER.—It will be well to illustrate the above important principles by questions similar in character to the following:—

If one man hires a horse to go a certain distance, and another hires one to go twice as far, how many times as much ought the second to pay for its use as the first pays? What would have been the answer to the above question, provided the second man had gone 3 times as far as the first? 4 times as far? $3\frac{1}{2}$ times as far? $\frac{1}{2}$ as far? $\frac{2}{3}$ as far? $\frac{3}{4}$ as far? &c., &c. If the horses are hired by the hour, and the first man keeps his horse three times as many hours as the second keeps his, how many times as much ought he to pay for the use of it? What would have been the answer had he kept it 5 times as long as the second? 8 times as long? 6 times as long? $\frac{1}{2}$ as long? $\frac{2}{3}$ as long? $\frac{3}{4}$ as long? &c., &c.

Similar questions should be asked with reference to other objects hired, as houses, money, &c., &c., till the principle is fully understood.

§ 2. DEFINITIONS.

Money is very frequently hired, and the sum to be paid for its use is determined in accordance with the above principles.

Money thus paid for the use of money is called *Interest*. The money used is called the *Principal*. The principal and interest added together form the *Amount*, or entire sum due at any given time. The interest of any principal is usually reckoned as a certain *per cent*, i. e., a certain number of one hundredths of that principal, for each year it is on interest. This per cent is called the *Rate per cent*, or simply the *Rate*.

NOTE. — The term *per cent*, from the Latin *per centum*, originally meant *by the hundred*, but as it is now used in arithmetic, it means *one hundredths*. Thus 6 per cent means $\frac{6}{100}$, or .06; 4 per cent means $\frac{4}{100}$, or .04; $\frac{1}{2}$ per cent means $\frac{1}{200}$, or $\frac{1}{2}$ of $\frac{1}{100}$, or $\frac{1}{200}$, &c., &c. This term may be applied to any thing else as well as money; and hence the definition (often given in the school room) "so many cents on 100 cents" is not a good one, any more than would be, *so many bushels on 100 bushels*, or *so many yards on 100 yards*. It is the more objectionable because scholars are sometimes led by it, and by being called upon to use the term *per cent* only in connection with money, to suppose that it has some necessary connection with cents, or with United States money.

§ 3. LEGAL RATE.

In nearly every state of the Union, laws have been passed forbidding persons to receive interest at more than some given rate. The highest annual rate of interest which the law of any state allows is called the *Legal Rate* of that state. Any excess of interest over the legal rate is called *Usury*. Those who receive usury are liable to be fined, or punished in some other way.*

In New York, South Carolina, Michigan, Wisconsin, and Iowa, the legal rate of interest is 7 per cent per year.

In Georgia, Alabama, Mississippi, Florida, and Texas, it is 8 per cent per year.

* It may not be amiss to remark that the laws regulating the rate of interest are very often disregarded, while the penalties for their violation are seldom imposed. Very few men continue long in business without paying or receiving interest at more than the legal rate. Money, having, like every thing else, a variable value, will bring what it is worth at the time it is sold or let, and it seems as impossible to regulate by law the price which shall be paid for its use, as to fix by law that which shall be paid for the use of any other article of property.

In Louisiana, it is 5 per cent; but the banks are allowed to charge 6 per cent.

In all the other states, the legal rate is 6 per cent per year.

By special agreement of the parties, interest may be charged at the rate of 10 per cent per annum in Mississippi, Louisiana, Missouri, and Arkansas, and at the rate of 12 per cent in Illinois, Wisconsin, and Iowa. In Maryland, the interest of debts due on tobacco contracts may be reckoned at 8 per cent.

On debts in favor of the United States, interest is computed at the rate of 6 per cent.

In each state, interest is reckoned at the legal rate of that state, unless otherwise specified.

In the United States, it is customary, when reckoning interest, to regard a year as 12 months, and a month as 30 days. But in England, the year is regarded as 365 days, and the number of days in the months considered, are reckoned as in the calendar.

§ 4. INTEREST FOR 2 MONTHS, 200 MONTHS, &c., AT 6 PER CENT.

1. If the interest of any sum for one year is 6 per cent of that sum, for $\frac{1}{6}$ of 1 year, or 2 months, it must be $\frac{1}{6}$ of 6 per cent, or 1 per cent of it. Therefore, at 6 per cent per year, the interest for 2 months is 1 per cent, or .01 of the principal, and may be found by removing the decimal point of the written principal two places towards the left. Thus the interest of \$75 for 2 months is \$.75; of \$364.30 is \$3.643, &c., &c.

2. What is the interest of \$84 for 2 months? of \$687? of \$1486.70? of \$327.41? * of \$637.86? of \$429.37? of \$888.75? of \$3.86? of \$57?

3. What is the amount of each of the above sums for 2 months?

4. If the interest of any sum for 2 months is .01 of that sum for .1 of 2 months, which is 6 days, it must be .1 of .01, or .001 of it. Therefore, at 6 per cent per year, the interest for 6

* The denominations below mills need not be given in the answer. Indeed, those below cents need not be given, if, when there are more than 5 mills, 1 be added to the number of cents.