

# 26 Tables, Formulas, and Measurements

## INTEREST COMPUTATION AND TABLES

Simple interest computation involves multiplying the principal (amount of note) by the selected interest rate and the product or result is the interest for one year. Remember, the interest rate (.06 or .09 for example) is a decimal and two points are to be marked off from the right.

There are 12 months in a year or 365 days. This latter figure makes for an awkward denominator. As a result, as an acceptable business practice, we assume 12 months of 30 days each, and 360 days to a year.

To avoid long computations which may involve cumbersome fractions, it is common to use prepared computations in the form of interest tables which show the base as \$1, \$100 or \$1,000 for a variety of interest and time periods. From the interest table, we determine the factor and multiply it by the amount involved if it exceeds or is less than the base of the table. The following illustrates the different methods and short cuts.

### *Long Conventional Method*

1. What is the interest on \$4,650 for 75 days at 10 percent?
2. What is the interest on \$4,650 for 1 year, 4 months and 10 days at 10 percent?

Answer:

1.  $4650 \times .10 \times 75/360 = \$96.88$

2.  $4650 \times .10 \times \{360 + 120 + 10\} / 360 = \$632.92$

(proper fraction for periods if less than 1 year; improper fraction for periods of more than 1 year)

### *Use of Interest Tables Method*

1. Same problem

Look in table on next page for 30 days at 10 percent

factor is  $8.3340 = 30$

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factor for 15 days  $\frac{4.1670}{20.8350} = \frac{15}{75 \text{ days}}$

$\$4,650 = \$4.65 \text{ per } \$1,000$

Multiply  $\$4.65 \times 20.8350 = \$96.88$

2. Table not complete to show higher factors, but it could be done this way:

30 day factor  $8.3340$   
 $\frac{\quad \times 16}{133.3440}$  (16 months)

$\frac{\quad \times 10}{2.7780}$  (10 days)

$136.1220$  factor for 1 year,  
4 months and 10 days at \$1,000

Therefore,  $136.1220 \times 4.65$  (number of thousands) = \$632.92 interest.

**INTEREST TABLE FIGURED ON \$1,000**

360 Days to the Year

<b>Days</b>	<b>5%</b>	<b>6%</b>	<b>7%</b>	<b>8%</b>	<b>9%</b>	<b>10%</b>
<b>1</b>	\$0.1389	\$0.1667	\$0.1944	\$0.2222	\$0.2500	\$0.2778
<b>2</b>	0.2778	0.3333	0.3889	0.4444	0.5000	0.5556
<b>3</b>	0.4167	0.5000	0.5833	0.6666	0.7500	0.8334
<b>4</b>	0.5556	0.6667	0.7778	0.8888	1.0000	1.1112
<b>5</b>	0.6944	0.8333	0.9722	1.1111	1.2500	1.3890
<b>6</b>	0.8333	1.0000	1.1667	1.3333	1.5000	1.6668
<b>7</b>	0.9722	1.1667	1.3611	1.5555	1.7500	1.9446
<b>8</b>	1.1111	1.3333	1.5556	1.7777	2.0000	2.2224
<b>9</b>	1.2500	1.5000	1.7500	2.0000	2.2500	2.5002
<b>10</b>	1.3889	1.6667	1.9444	2.2222	2.5000	2.7780
<b>11</b>	1.5278	1.8333	2.1389	2.4444	2.7500	3.0558
<b>12</b>	1.6667	2.0000	2.3333	2.6666	3.0000	3.3336
<b>13</b>	1.8056	2.1667	2.5278	2.8888	3.2500	3.6114
<b>14</b>	1.9444	2.3333	2.7222	3.1111	3.5000	3.8892
<b>15</b>	2.0833	2.5000	2.9167	3.3333	3.7500	4.1670
<b>16</b>	2.2222	2.6667	3.1111	3.5555	4.0000	4.4448
<b>17</b>	2.3611	2.8333	3.3055	3.7777	4.2500	4.7226
<b>18</b>	2.5000	3.0000	3.5000	4.0000	4.5000	5.0004
<b>19</b>	2.6389	3.1667	3.6944	4.2222	4.7500	5.2782
<b>20</b>	2.7778	3.3333	3.8889	4.4444	5.0000	5.5560
<b>21</b>	2.9167	3.5000	4.0833	4.6666	5.2500	5.8338
<b>22</b>	3.0556	3.6667	4.2778	4.8888	5.5000	6.1116
<b>23</b>	3.1944	3.8333	4.4722	5.1111	5.7500	6.3894
<b>24</b>	3.2222	4.0000	4.6667	5.3333	6.0000	6.6672
<b>25</b>	3.4722	4.1667	4.8611	5.5555	6.2500	6.9450
<b>26</b>	3.6111	4.3333	5.0555	5.7777	6.5000	7.2228
<b>27</b>	3.7500	4.5000	5.2500	6.0000	6.7500	7.5006
<b>28</b>	3.8889	4.6667	5.4444	6.2222	7.0000	7.7784
<b>29</b>	4.0278	4.8333	5.6389	6.4444	7.2500	8.0562
<b>30</b>	4.1667	5.0000	5.8333	6.6666	7.5000	8.3340

**TABLE OF MONTHLY PAYMENTS  
TO AMORTIZE \$1,000 LOAN**

<b>Years</b>	<b>2.0%</b>	<b>2.5%</b>	<b>3.0%</b>	<b>3.5%</b>	<b>4.0%</b>	<b>4.5%</b>	<b>5.0%</b>	<b>5.5%</b>	<b>6.0%</b>	<b>6.5%</b>
<b>5</b>	17.53	17.75	17.97	18.19	18.42	18.64	18.87	19.10	19.33	19.58
<b>6</b>	14.75	14.97	15.19	15.42	15.65	15.87	16.10	16.34	16.57	16.83
<b>7</b>	12.77	12.99	13.21	13.44	13.67	13.90	14.13	14.37	14.61	14.87
<b>8</b>	11.28	11.50	11.73	11.96	12.19	12.42	12.66	12.90	13.14	13.41
<b>9</b>	10.13	10.35	10.58	10.81	11.04	11.28	11.52	11.76	12.01	12.27
<b>10</b>	9.20	9.43	9.66	9.89	10.12	10.36	10.61	10.85	11.10	11.38
<b>11</b>	8.45	8.67	8.90	9.14	9.38	9.62	9.86	10.11	10.37	10.64
<b>12</b>	7.82	8.05	8.28	8.51	8.76	9.00	9.25	9.50	9.76	10.04
<b>13</b>	7.28	7.51	7.75	7.99	8.23	8.48	8.73	8.99	9.25	9.53
<b>14</b>	6.83	7.06	7.30	7.54	7.78	8.03	8.29	8.55	8.81	9.10
<b>15</b>	6.44	6.67	6.91	7.15	7.40	7.65	7.91	8.17	8.44	8.73
<b>16</b>	6.09	6.32	6.56	6.81	7.06	7.32	7.58	7.84	8.11	8.41
<b>17</b>	5.79	6.02	6.26	6.51	6.76	7.02	7.29	7.56	7.83	8.13
<b>18</b>	5.52	5.75	6.00	6.25	6.50	6.76	7.03	7.30	7.58	7.89
<b>19</b>	5.28	5.51	5.76	6.01	6.27	6.53	6.80	7.08	7.36	7.67
<b>20</b>	5.06	5.30	5.55	5.80	6.06	6.33	6.60	6.88	7.16	7.48
<b>21</b>	4.86	5.10	5.35	5.61	5.87	6.14	6.42	6.70	6.99	7.31
<b>22</b>	4.69	4.93	5.18	5.44	5.70	5.97	6.25	6.54	6.83	7.15
<b>23</b>	4.52	4.77	5.02	5.28	5.55	5.82	6.10	6.39	6.69	7.02
<b>24</b>	4.37	4.62	4.88	5.14	5.41	5.68	5.97	6.26	6.56	6.89
<b>25</b>	4.24	4.49	4.74	5.01	5.28	5.56	5.85	6.14	6.44	6.78
<b>26</b>	4.11	4.36	4.62	4.89	5.16	5.44	5.73	6.03	6.34	6.67
<b>27</b>	4.00	4.25	4.51	4.78	5.05	5.34	5.63	5.93	6.24	6.58
<b>28</b>	3.89	4.14	4.40	4.67	4.95	5.24	5.54	5.84	6.15	6.50
<b>29</b>	3.79	4.04	4.31	4.58	4.86	5.15	5.45	5.76	6.07	6.42
<b>30</b>	3.70	3.95	4.22	4.49	4.77	5.07	5.37	5.68	6.00	6.35
<b>35</b>	3.31	3.57	3.85	4.13	4.43	4.73	5.05	5.37	5.70	6.07
<b>40</b>	3.03	3.30	3.58	3.87	4.18	4.50	4.82	5.16	5.50	5.88

**TABLE OF MONTHLY PAYMENTS  
TO AMORTIZE \$1,000 LOAN**

<b>Years</b>	<b>7.0%</b>	<b>7.5%</b>	<b>8.0%</b>	<b>8.5%</b>	<b>9.0%</b>	<b>9.5%</b>	<b>10.0%</b>	<b>10.5%</b>	<b>11.0%</b>	<b>11.5%</b>	<b>12.0%</b>	<b>12.5%</b>
<b>5</b>	19.80	20.04	20.28	20.52	20.76	21.01	21.25	21.49	21.74	21.99	22.25	22.50
<b>6</b>	17.05	17.29	17.53	17.78	18.03	18.28	18.53	18.78	19.04	19.29	19.55	19.81
<b>7</b>	15.09	15.34	15.59	15.84	16.09	16.35	16.61	16.86	17.12	17.39	17.65	17.92
<b>8</b>	13.63	13.88	14.14	14.39	14.66	14.92	15.18	15.44	15.71	15.98	16.25	16.53
<b>9</b>	12.51	12.76	13.02	13.28	13.55	13.81	14.08	14.35	14.63	14.90	15.18	15.47
<b>10</b>	11.61	11.87	12.13	12.40	12.67	12.94	13.22	13.49	13.78	14.06	14.35	14.64
<b>11</b>	10.88	11.15	11.42	11.69	11.97	12.24	12.52	12.80	13.09	13.38	13.68	13.98
<b>12</b>	10.28	10.55	10.82	11.10	11.39	11.67	11.96	12.24	12.54	12.83	13.13	13.44
<b>13</b>	9.78	10.05	10.33	10.61	10.90	11.19	11.48	11.78	12.08	12.38	12.69	13.00
<b>14</b>	9.35	9.63	9.91	10.20	10.49	10.79	11.09	11.38	11.69	12.00	12.31	12.63
<b>15</b>	8.99	9.27	9.56	9.85	10.15	10.45	10.75	11.05	11.37	11.68	12.00	12.33
<b>16</b>	8.67	8.96	9.25	9.54	9.85	10.15	10.46	10.77	11.09	11.41	11.74	12.07
<b>17</b>	8.40	8.69	8.98	9.28	9.59	9.90	10.22	10.53	10.85	11.18	11.51	11.85
<b>18</b>	8.16	8.45	8.75	9.05	9.37	9.68	10.00	10.32	10.65	10.98	11.32	11.66
<b>19</b>	7.94	8.24	8.55	8.85	9.17	9.49	9.82	10.14	10.47	10.81	11.15	11.50
<b>20</b>	7.75	8.06	8.36	8.68	9.00	9.33	9.66	9.98	10.32	10.66	11.01	11.36
<b>21</b>	7.58	7.89	8.20	8.52	8.85	9.18	9.51	9.85	10.19	10.54	10.89	11.24
<b>22</b>	7.43	7.75	8.06	8.38	8.72	9.05	9.39	9.73	10.07	10.42	10.78	11.14
<b>23</b>	7.30	7.61	7.93	8.26	8.60	8.93	9.28	9.62	9.97	10.33	10.69	11.05
<b>24</b>	7.18	7.50	7.82	8.15	8.49	8.83	9.18	9.52	9.88	10.24	10.60	10.97
<b>25</b>	7.07	7.39	7.72	8.05	8.40	8.74	9.09	9.44	9.80	10.16	10.53	10.90
<b>26</b>	6.97	7.29	7.63	7.96	8.31	8.66	9.01	9.37	9.73	10.10	10.47	10.84
<b>27</b>	6.88	7.21	7.54	7.88	8.23	8.58	8.94	9.30	9.67	10.04	10.41	10.79
<b>28</b>	6.80	7.13	7.47	7.81	8.16	8.52	8.88	9.25	9.61	9.99	10.37	10.75
<b>29</b>	6.72	7.06	7.40	7.75	8.10	8.46	8.82	9.19	9.57	9.94	10.32	10.71
<b>30</b>	6.65	6.99	7.34	7.69	8.05	8.41	8.78	9.15	9.52	9.90	10.29	10.67
<b>35</b>	6.39	6.74	7.10	7.47	7.84	8.22	8.60	8.98	9.37	9.76	10.16	10.55
<b>40</b>	6.21	6.58	6.95	7.33	7.71	8.10	8.49	8.89	9.28	9.68	10.09	10.49

**OTHER SHORTCUT METHODS  
FOR COMPUTING SIMPLE INTEREST**

4%	Multiply the principal by number of days; cut off right-hand figure and divide by 9.
5%	Multiply by number of days and divide by 72.
6%	Multiply by number of days; cut off right-hand figure and divide by 6.
7%	Compile the interest for 6% and add 1/6.
8%	Multiply by number of days and divide by 45.
9%	Multiply by number of days; cut off right-hand figure and divide by 4.
10%	Multiply by number of days and divide by 36.

**BANKERS 12%-30 DAY/6%-60 DAY INTEREST**

**COMPUTATION METHOD**

(Using 360 day year)

To find interest on any principal amount for 30 days at 12%, or for 60 days at 6%, simply move the decimal point in the principal amount two places to the left.

Therefore, the interest amount on \$8432.67 at 12% for 30 days is \$84.33.

Likewise, the interest amount on \$8432.67 at 6% for 60 days is \$84.33

(Since 12% per annum is 1% a month, and 1% of any number is the hundredth part of it, then by pointing off two places from the right of a number, it is in effect divided by 100.)

What is the interest on \$7397.64 at 9% for 69 days?

Interest @ 6% for 60 days = \$73.98 (move decimal two places to left)

Interest @ 3% for 60 days = 36.99 (1/2 of 6% amount)

Interest @ 9% for 60 days = 110.97

We still need 9 days more interest:

6 days = 1/10 of 60 days:      6 days      =    11.09    (1/10 of \$110.97)

3 days = 1/2 of 6 days          3 days      =    5.55    (1/2 of \$11.09)

9 days                              =    16.64

Therefore, interest @ 9% for 69 days = \$110.97 + \$16.64 = \$127.61

**FORMULAS*****Three-Variable Formulas***

In three-variable formulas, each variable is a function of the other two.

**Income Formula**

Income = Rate x Value

$$I = R \times V$$

$$R = I \div V$$

$$V = I \div R$$

**Percentage Formula**

Percentage = Rate x Base

$$P = R \times B$$

$$R = P \div B$$

$$B = P \div R$$

**Area Formula**

Area = Length x Width

$$A = L \times W$$

$$L = A \div W$$

$$W = A \div L$$

**Property Tax Formula**

Tax = Assessed Value x Rate

$$T = A \times R$$

$$A = T \div R$$

$$R = T \div A$$

**Commission Formula**

Commission = Sale Price x Rate

$$C = S \times R$$

$$S = C \div R$$

$$R = C \div S$$

**LINEAR AND SPATIAL MEASUREMENTS****AS USED IN APPRAISING AND LAND DESCRIPTIONS*****Common Linear Measurements***

One foot = 12 inches

One yard = 3 feet or 36 inches

One rod = 16 1/2 feet or 5 1/2 yards

One furlong = 40 rods

100 feet = 6.6 rods

One mile = 5,280 feet; 1,760 yards; 320 rods; or 80 chains

***Surveyors' Measurements***

1 link = 7.92 inches

1 rod = 25 links

1 chain = 4 rods or 66 feet

(These are the old surveyors' measurements. Modern surveyors use a steel tape or what is called an engineer's chain which is 100 feet long with links of one foot. Thus, a mile measured by a modern steel tape chain is 52.8 chains.)

***Spatial or Area Measurements (Length x Width)***

1 square foot = 144 square inches

1 square yard = 9 square feet

1 square rod = 30 1/4 square yards

1 acre = 10 square chains; 160 square rods; 4,840 square yards; 43,560 square feet

(An acre is an odd and inconsistent measurement. It is supposed to have been the amount of land that a farmer could plow in a day with oxen and the old wooden plow. As a square, it is approximately 208.71 feet on a side.)

A section = 1 square mile or 640 acres

A township = 36 square miles

A quarter section = 160 acres

Area of a square or rectangle = length x width in unit of linear measurement used

Area of a triangle = base  $\times$   $\frac{1}{2}$  height

**Cubic Measurement (Length  $\times$  Width  $\times$  Height)**

1 cubic foot = 1,728 cubic inches.

1 cubic yard = 27 cubic feet.

### SOME METRIC EQUIVALENTS

<i>Lengths</i>	<i>Areas</i>
one foot = 0.3048 meter	one square foot = 0.0929 sq. meter
one yard = 0.9144 meter	one square yard = 0.836 sq. meter
one mile = 1.6093 kilometers or 1609 meters	one acre = 4068.8 sq. meters
one meter = 39 inches	one square mile = 259 hectares or 2.59 sq. km.
one kilometer = 3281 feet or .62 miles or 1000 meters	one square meter = 10.76 sq. feet
	one hectare = 2.47 acres or 10,000 sq. meters

