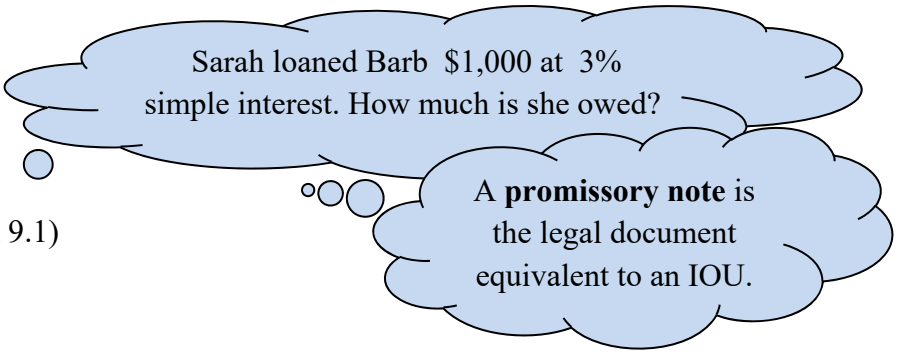
Business Mathematics
Class notes
Basics of Simple Interest (section 9.1)

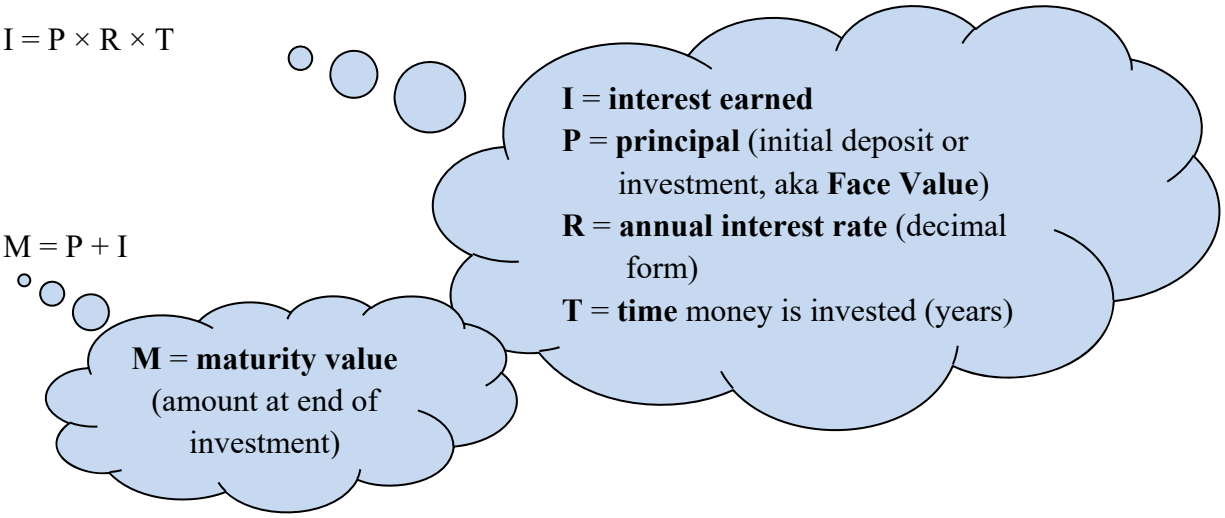


Main Idea and Formulas:

With **simple interest**, we deposit money in a bank or invest it by loaning it to someone. After a certain time, we get the money back plus some interest. Our general formulas are below.

$I = P \times R \times T$

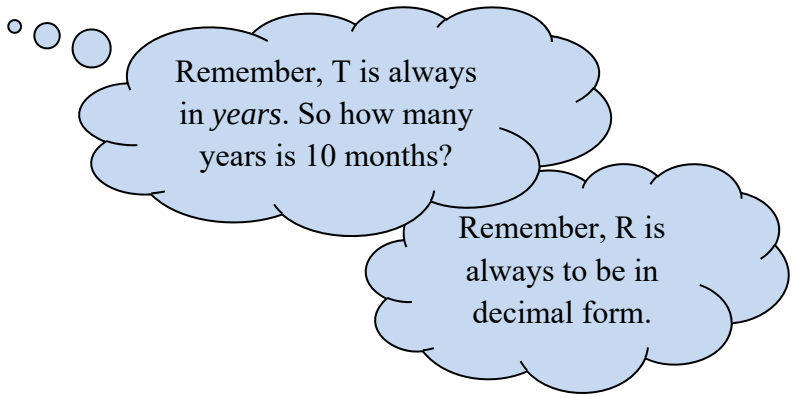
$M = P + I$



This second formula just makes it clear that the amount of money you have at the end is the amount you started with plus any interest that was earned. You may remember learning about **compound interest**; we will study that in the next chapter.

expl 1: Find the simple interest and maturity value to the nearest cent for the following investment.

$10,200 invested at 9.5% for 10 months



How Time (T) is Measured in Days:

If time is given in months, like the previous example, we divide the number of months by 12 to get the number of years. Do that to convert the following to years.

6 months = _____ years and 7 months = _____ years

But some loan periods are given in days. Say Bob takes out a loan for 40 days. Or Joel loans Harriet $400 but insists on repayment in 180 days. What is the value of T?

There are actually two different methods. Both sort of divide by the number of days in a year, but…

Method 1: Exact Interest:

$$T = \frac{\text{Number of days in loan}}{365}$$

Use 366 for a leap year.

Method 2: Ordinary (or Banker's) Interest:

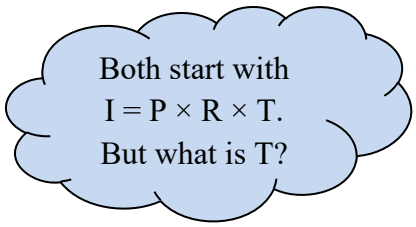
$$T = \frac{\text{Number of days in loan}}{360}$$

This is used by default. If a problem does *not* indicate which to use, use banker's interest.

Which do you think would make T (and hence, I) larger?

expl 2a: Find the exact interest and the ordinary interest to the nearest cent for the following loan. Be sure to label them.

$185,000 at 7.5% for 180 days



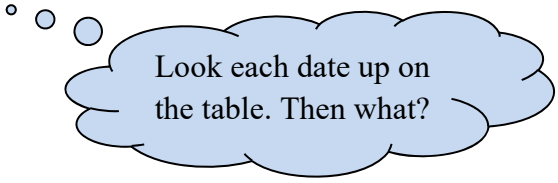
expl 2b: Find the amount by which the ordinary interest is larger.

expl 2c: What is the maturity value for the loan using ordinary interest? Label it as M.

The Number of Each Day of the Year:

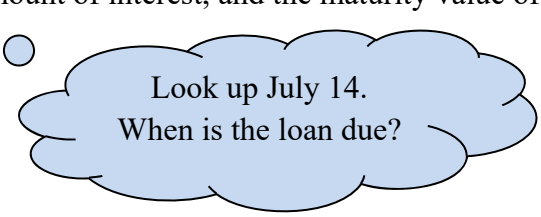
You may be told that a loan was taken out July 2 and is due September 15. But how many days is that? You can count as we did in previous sections but in this section, we have the table on the last page of the notes. Let's see how useful it is on the next examples.

expl 3: Find the exact number of days from May 22 to August 30. (None of the years are leap years.)



expl 4: Find the due date, the amount of interest, and the maturity value of this loan. Use banker's interest.

Date Loan was Made: July 14
Face Value: $20,400
Term of Loan: 90 days
Rate: 8%



The Number of Each of the Days of the Year

Day of month	January	February	March	April	May	June	July	August	September	October	November	December	Day of month
1	1	32	60	91	121	152	182	213	244	274	305	335	**1**
2	2	33	61	92	122	153	183	214	245	275	306	336	**2**
3	3	34	62	93	123	154	184	215	246	276	307	337	**3**
4	4	35	63	94	124	155	185	216	247	277	308	338	**4**
5	5	36	64	95	125	156	186	217	248	278	309	339	**5**
6	6	37	65	96	126	157	187	218	249	279	310	340	**6**
7	7	38	66	97	127	158	188	219	250	280	311	341	**7**
8	8	39	67	98	128	159	189	220	251	281	312	342	**8**
9	9	40	68	99	129	160	190	221	252	282	313	343	**9**
10	10	41	69	100	130	161	191	222	253	283	314	344	**10**
11	11	42	70	101	131	162	192	223	254	284	315	345	**11**
12	12	43	71	102	132	163	193	224	255	285	316	346	**12**
13	13	44	72	103	133	164	194	225	256	286	317	347	**13**
14	14	45	73	104	134	165	195	226	257	287	318	348	**14**
15	15	46	74	105	135	166	196	227	258	288	319	349	**15**
16	16	47	75	106	136	167	197	228	259	289	320	350	**16**
17	17	48	76	107	137	168	198	229	260	290	321	351	**17**
18	18	49	77	108	138	169	199	230	261	291	322	352	**18**
19	19	50	78	109	139	170	200	231	262	292	323	353	**19**
20	20	51	79	110	140	171	201	232	263	293	324	354	**20**
21	21	52	80	111	141	172	202	233	264	294	325	355	**21**
22	22	53	81	112	142	173	203	234	265	295	326	356	**22**
23	23	54	82	113	143	174	204	235	266	296	327	357	**23**
24	24	55	83	114	144	175	205	236	267	297	328	358	**24**
25	25	56	84	115	145	176	206	237	268	298	329	359	**25**
26	26	57	85	116	146	177	207	238	269	299	330	360	**26**
27	27	58	86	117	147	178	208	239	270	300	331	361	**27**
28	28	59	87	118	148	179	209	240	271	301	332	362	**28**
29	29		88	119	149	180	210	241	272	302	333	363	**29**
30	30		89	120	150	181	211	242	273	303	334	364	**30**
31	31		90		151		212	243		304		365	**31**

Add 1 to each day after February 29 for leap years.