

Section 3.1 – Practice Problems

Find the future value of the loan using Simple Interest

1. $P = \$1080, r = 3.45\%, t = 4.5 \text{ years}$

$$I = Prt$$

$$I = 1080(0.0345)(4.5)$$

$$I = 167.67$$

$$FV: 1247.67$$

2. $P = \$4250, r = 5.3\%, t = 42 \text{ months}$

$$I = Prt$$

$$I = 4250(0.053)\left(\frac{42}{12}\right)$$

$$I = 788.38$$

$$FV: 5038.38$$

3. $P = \$6625, r = 4.7\%, t = 130 \text{ weeks}$

$$I = Prt$$

$$I = 6625(0.047)\left(\frac{130}{52}\right)$$

$$I = 778.44$$

$$FV: 7403.44$$

4. $P = \$3360, r = 9.5\%, t = 240 \text{ days}$

$$I = Prt$$

$$I = 3360(0.095)\left(\frac{240}{365}\right)$$

$$I = 209.88$$

$$FV: 3569.88$$

The following loans are discounted. For each question find: the discount, the amount of money received, and the true interest rate

5. $P = \$6500, r = 6.5\%, t = 4 \text{ years}$

$$I = 6500(0.065)(4)$$

$$= 1690$$

$$DL = 6500 - 1690 = 4810$$

$$r = \frac{1690}{4810 \cdot 4} = 0.0878 = 8.78\%$$

6. $P = \$9600, r = 8.25\%, t = 2 \text{ years}$

$$I = 9600(0.0825)(2)$$

$$= 1584$$

$$DL: 9600 - 1584 = 8016$$

$$r = \frac{1584}{8016 \cdot 2} = 0.0988 = 9.9\%$$

Find the future amount and interest, using the Compound Interest formula

	Principal	Rate	Compounded	Time	Future Amount	Interest
7.	\$6200	4.5%	Semi-annually	3 year	7085.52	885.52
8.	\$7500	5.3%	Quarterly	4.5 years	9505.18	2005.18
9.	\$9600	8%	Monthly	1.5 years	10819.66	1219.66
10.	\$2500	7.5%	Weekly	6 years	3919.51	1419.51
11.	\$5000	6%	Daily	3 years	5986.00	986.00

Work Space

$$7. A = P\left(1 + \frac{r}{n}\right)^{nt}$$

$$= 6200\left(1 + \frac{0.045}{2}\right)^{2(3)}$$

$$= 7085.52$$

$$A = P + I$$

$$\therefore I = A - P$$

$$= 7085.52 - 6200.00$$

$$= 885.52$$

12. A new computer has a 3 year payment plan with monthly payments of \$36.80. The cost of the computer is 964.20. Find the interest rate of the computer using simple interest.

3 yrs in months

$$36 \cdot 36.80 = 1324.80$$

$$I = 1324.80 - 964.20 = 360.60$$

$$r = 12.47\%$$

$$r = \frac{I}{P \cdot t} \rightarrow r = \frac{360.60}{964.20(3)} = 0.1246$$

13. For a set of new tires costing \$648.48 including tax, you are offered low monthly payments of \$42.60 over 18 months. Find the interest rate for the tires using simple interest.

$$18 \cdot 42.60 = 766.80$$

$$I = 766.80 - 648.48 = 118.32$$

$$r = \frac{118.32}{648.48(1.5)} = 0.1216$$

$$r = 12.16\%$$

14. An 18 year old plans to retire at age 55. She decided to invest her inheritance of \$50 000 at 6% compounded quarterly. How much will she have at 55?

55-18=37
t

$$A = P(1 + \frac{r}{n})^{n \cdot t}$$

$$A = ?$$

$$A = 50000(1 + \frac{0.06}{4})^{4 \cdot 37}$$

$$P = 50000$$

$$r = 6\% = 0.06$$

$$n = 4$$

$$t = 37$$

$$A = 452\,839.45$$

15. The Smiths hope to accumulate \$40 000 for a new car in 5 years. How much would they need to invest right now at 5.2% compounded monthly to reach their goal?

$$A = P(1 + \frac{0.052}{12})^{12 \cdot 5}$$

$$A = 40000$$

$$40000 = P(1 + \frac{0.052}{12})^{60}$$

$$P = ?$$

$$n = 12$$

$$t = 5$$

$$r = 0.052$$

$$P = \frac{40000}{(1 + \frac{0.052}{12})^{60}}$$

$$P = 30\,859.39$$

16. An investor deposits \$8000 into an account paying 6% compounded quarterly. Three years later he deposits \$5000 into the same account. How much money was there at the end of 5 years?

$$A = 8000(1 + \frac{0.06}{4})^{4 \cdot 3}$$

$$9564.95$$

$$+ 5000$$

$$A = 14564.95(1 + \frac{0.06}{4})^{4 \cdot 2}$$

$$A = 16407.31$$

17. What percentage of Simple Interest would be needed on a 12 year investment to have the same future value as one that pays 6% compounded quarterly?

$$A = P(1 + \frac{0.06}{4})^{4 \cdot 12}$$

$$A = P(1.015)^{48}$$

Both equal the same

$$P(1.015)^{48} = P(1 + 12r)$$

$$1.015^{48} = 1 + 12r$$

$$\frac{1.04}{12} = r \quad r = 0.087$$

$$I = Prt$$

$$A = P + I$$

$$A = P + Prt$$

$$A = P(1 + rt)$$

$$A = P(1 + 12r)$$

$$r = 8.7\%$$