

Section 6.2 – Practice Problems

Find the amount of each annuity

Payment	Rate	Compounded	Time	Future Value
1. \$2500	5%	Annually	10 years	$F = \frac{2500 \left[\left(1 + \frac{0.05}{1} \right)^{1 \cdot 10} - 1 \right]}{0.05}$ <div style="border: 1px solid black; padding: 5px; display: inline-block;">F = 31444.73</div>
2. \$6000	6.5%	Semi-Annually	25 years	<div style="border: 1px solid black; padding: 5px; display: inline-block;">729 015.78</div>
3. \$1200	4%	Quarterly	8 years	<div style="border: 1px solid black; padding: 5px; display: inline-block;">44 992.88</div>
4. \$500	9%	Monthly	15 years	<div style="border: 1px solid black; padding: 5px; display: inline-block;">189 202.88</div>
5. \$300	10%	Bi-Weekly	5 years	<div style="border: 1px solid black; padding: 5px; display: inline-block;">50 476.98</div>

Find the Periodic payment need to attain the future amount of each annuity

Future Value	Rate	Compounded	Time	Periodic Payment
6. \$7500	3.6%	Semi-Annually	6 years	$7500 = R \left[\frac{(1 + \frac{0.036}{2})^{2 \cdot 6} - 1}{\frac{0.036}{2}} \right]$ $R = \frac{7500 \left(\frac{0.036}{2} \right)}{(1 + \frac{0.036}{2})^{2 \cdot 6} - 1} = 565.51$
7. \$35 000	5.4%	Quarterly	9 years	761.45
8. \$1 000 000	7.5%	Monthly	25 years	1139.91

9. In order to plan for their retirement, a married couple decides to buy an annuity that pay 6% interest compounded semi-annually. If they invest \$2500 semi-annually for 35 years, how much interest would they earn?

$$F = \frac{2500 \left[\left(1 + \frac{0.06}{2} \right)^{2 \cdot 35} - 1 \right]}{\frac{0.06}{2}}$$

$$F = 576\,485.16$$

$$I = 576\,485.16 - (2500 \cdot 2 \cdot 35)$$

$$= 401\,485.16$$

10. You have \$5000 to invest and are offered a 5 year investment at 4.5% simple interest, or an annuity of \$1000 per year for 5 years at 9% compounded annually. If your only concern is the future amount, what is the better investment?

$$i) I = 5000(0.045)(5) = 6125$$

$$ii) F = \frac{1000 \left[\left(1 + \frac{0.09}{1} \right)^5 - 1 \right]}{0.09}$$

$$= 5984.71$$

Simple Interest better by: \$140.29

11. Sally bought a stereo for \$760. She made a down payment of \$60, and paid \$65 per month for a year. What was the total instalment price of the stereo?

$$65 \cdot 12 = 780 \text{ in a year}$$

$$780 + 60 = \$840$$

Total Installed Price: 840

12. Hunter bought a 75 inch TV for \$2600, including taxes. He made a down payment of 20% and paid the balance over 18 months. The financial charges were 6% of the amount financed. Determine the instalment price of the TV, and monthly payments.

$$2600 \cdot 0.80 \xrightarrow{\text{price after 20\% down}} = 2080$$

$$\text{Installment: } 2080 + (2080 \cdot 0.06) = 2204.80$$

$$\text{Monthly: } \frac{2204.80}{18} = \boxed{\$122.49}$$

13. A \$12 000 loan is to be paid off in 48 monthly payments of \$292.96. The borrower decides to pay off the loan after 30 payments have been made. Find the amount of interest saved.

$$\frac{12000}{48} = \$250$$

$$292.96 - 250 = 42.96 \text{ interest / payment}$$

$$I_{48} = 42.96 \cdot 48 = 2062.08$$

$$I_{30} = 42.96 \cdot 30 = 1288.8$$

$$\text{Interest Saved} = \boxed{\$773.28}$$

14. Parker Publishing borrows \$20 000 to be paid off with 36 monthly payments of \$664.29. After good sales, they decide to pay off the loan in 24 months. Find the amount saved.

$$ID \quad \frac{20000}{36} = 555.56$$

$$664.29 - 555.56 = \$108.73 \text{ interest / payment}$$

$$I_{24} = 2609.63$$

$$I_{36} = 3914.28$$

$$\text{Saved: } \boxed{\$1304.65}$$

15. For the month of March, Nadine had an unpaid balance of \$2340.62 on her credit card. She purchased \$369.78 and made a payment of \$300 during the month. If the interest is 2% on the unpaid balance, what is her new balance on April 1st, and what is the annual percentage rate?

$$2340.62 + 369.78 - 300 = 2410.40$$

NEW BALANCE

$$2410.40 + (2410.40 \cdot 0.02)$$

$$= \boxed{2458.61}$$

16. For the month of November, the unpaid balance on Alissa's credit card statement was \$1816.22. She purchased \$435.85 and made a payment of \$400 during the month. If the interest is 1.8% on the unpaid balance, what is her new balance on December 1st, and what is the annual percentage rate?

$$1816.22 + 435.85 - 400 = 1852.07$$

New Balance

$$1852.07 + (1852.07 \cdot 0.018)$$

$$= \boxed{1885.41}$$