

Period: _____

Name: Key

*** Chapter 8 Assignment - Finance**

/36

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- Karl is purchasing a new television that costs \$2250. He has two different options to finance the purchase and he wants to pay off the debt in a year by making regular monthly payments. Which of the following options is the better deal, and what is the difference in amount owing? (3 marks)

Option A: Finance the purchase through the store at an interest rate of 12.1%, compounded semi-weekly. (twice a week... x 52 weeks/yr. = 104 for n)

Option B: Finance the purchase with a line of credit at an interest rate of 10.2%, compounded daily. (n=365)

(A) $A = P(1 + \frac{r}{n})^{nt}$
 $= 2250(1 + \frac{0.121}{104})^{104 \cdot 1}$
 $= 2250(1.1285455)$
 $= \$2539.23$

(B) $A = P(1 + \frac{r}{n})^{nt}$
 $= 2250(1 + \frac{0.102}{365})^{365 \cdot 1}$
 $= 2250(1.10736769)$
 $= \$2491.58$

$$\begin{array}{r} 2539.23 \\ - 2491.58 \\ \hline 47.65 \end{array}$$

Option B is a better deal by \$47.65 *

- Determine the interest rate of a \$75 000 10-year simple interest investment if the future value of the investment is \$80 000. (2 marks)

A = 80000
P = 75000
r = ?
t = 10

$A = P(1 + rt)$

$\frac{80000}{75000} = \frac{75000}{75000}(1 + r(10))$

$1.0666667 = 1 + 10r \rightarrow \frac{0.0666667}{10} = \frac{10r}{10} \rightarrow r = 0.006667$

$r = 0.006667$
 $r = 0.67\%$

- Determine the future value of quarterly deposits of \$1000 into an account that pays 5.1% interest, compounded quarterly, for 19 years. (2 marks)

R = 1000
r = 0.051
n = 4
t = 19

$F = R \left[\frac{(1 + \frac{r}{n})^{nt} - 1}{\frac{r}{n}} \right]$

$= 1000 \left[\frac{(1 + \frac{0.051}{4})^{4 \cdot 19} - 1}{\frac{0.051}{4}} \right] = \frac{1619.21}{0.01275} = 126997.25$

future value
\$126997.25

4. Jody must now pay \$30 000 to pay off her bank loan, which she borrowed 8 years ago. The loan was compounded quarterly at an interest rate of 6.1%. How much did Jody originally borrow? (2 marks)

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

$$30000 = P \left(1 + \frac{0.061}{4}\right)^{4(8)}$$

$$\frac{30000}{1.623065107} = \frac{P(1.623065107)}{1.623065107}$$

$$P = \$18483.55$$

She originally borrowed
\$18483.55

5. Rodrigo estimates that he will need \$6500 for a vacation he is planning for 18 months from now. How much money should he invest now, at 4.8% simple interest, to meet his goal? (2 marks)

$$A = 6500$$

$$r = 0.048$$

$$t = \frac{18}{12}$$

$$P = ?$$

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

$$6500 = P \left(1 + (0.048) \left(\frac{18}{12}\right)\right)$$

$$\frac{6500}{1.072} = \frac{P(1.072)}{1.072} \rightarrow P = \$6063.43$$

Rodrigo needs to invest \$6063.43

6. Aria receives a two-year \$9000 discount loan at 6% simple interest. Find the actual interest rate? (2 marks)

$$I = Prt$$

$$I = (9000)(0.06)(2)$$

$$I = 1080$$

Discount loan amount

$$9000 - 1080$$

$$= 7920$$

Actual principal

$$1080 = (7920)(r)(2)$$

$$\frac{1080}{15840} = \frac{15840r}{15840}$$

$$r = 0.0681 \rightarrow \boxed{6.81\%}$$

7. What is a better investment: 8% compounded quarterly or 7.5% compounded monthly? (3 marks)

$$E = \left(1 + \frac{r}{n}\right)^n - 1$$

$$E = \left(1 + \frac{0.08}{4}\right)^4 - 1$$

$$= 0.0824$$

$$= 8.24\%$$

$$E = \left(1 + \frac{r}{n}\right)^n - 1$$

$$= \left(1 + \frac{0.075}{12}\right)^{12} - 1$$

$$= 0.0776$$

$$= 7.76\%$$

8% compounded quarterly is a better investment

8. (0.5 marks each)

Stock information for Apple Inc. over 52 weeks is given.

Stock	High	Low	Div	YLD%	P/E	Vol (1000's)	Close	Net CHG
AAPL	118.69	89.47	2.28	----	----	32163	116.02	+ 0.02

a. What was the highest price that the stock sold for during the last 52 weeks?

\$ 118.69

b. What was the lowest price the stock sold for during the last 52 weeks?

\$ 89.47

c. What was the amount of dividend per share that the company paid last year?

2.28

d. If you own 850 shares, how much in dividends did you make last year?

$850 \times 2.28 = \$1938$

e. How many shares were traded yesterday? 32,163,000

f. What was the closing price of the stock yesterday? \$ 116.02

g. Find the P/E ratio, if the earnings per share are \$8.29

$$\text{P/E ratio} = \frac{\text{yesterday's closing price}}{\text{annual earning per share}} = \frac{116.02}{8.29} = 14$$

h. What was the closing price of the stock the day before yesterday?

Net change: +0.02 meaning the stock went up by 0.02 from the day before yesterday

$\$116.02 - 0.02 = \116.00

i. Find the yield for Apple Inc. Stock.

$$\text{yield} = \frac{\text{annual dividend per share}}{\text{closing price of stock}} = \frac{2.28}{116.02} = 0.0197 = \underline{\underline{1.97\%}}$$

j. If you purchased 400 shares of Apple Inc. at the low price in the last 52 weeks and sold at the close price, what profit did you make? (omit dividends)

$$(400 \times 116.02) - (400 \times 89.47)$$

$$= 46408 - 35788$$

$$= \$10620 \text{ profit}$$

9. An investor purchased 200 shares of stock for \$35.50 per share, and later sold them for \$41.20. The broker's commission was 1.6% on both the purchase and selling price. Find the amount the investor made or lost on the stock. (3 marks)

purchase $200 \times 35.50 = 7100$

commission $7100 \times 0.016 = 113.6$

selling price $200 \times \$41.20 = 8240$

commission $8240 \times 0.016 = 131.84$

spent: $7100 + 113.6 = \$7213.60$

gained: $8240 - 131.84 = 8108.16$

earned: $8108.16 - 7213.60 = \$894.56$ made!

* add commission when buying
* subtract commission when selling

10. On December 1st, Marvin has an unpaid balance of \$1305.50 on his credit card. In December, he made purchases of \$398.60 and made a balance on the payment of \$450.00. The monthly interest on the unpaid balance was 2.5%. Find the finance charges (interest) and the new balance on January 1st. (3 marks)

New balance = $1305.50 + 398.60 - 450 = \1254.10

Finance charges = $1254.10 \times 0.025 = \$31.35$

New balance:
 $1254.10 + 31.35 = \$1285.45$

11. Jamie bought a new car for \$26000. She made a down payment of 15% and paid off the balance in monthly payments over 2 years. Find the monthly payment if the interest rate is 12% on the amount financed. (3 marks)

Down payment: $26000 \times 0.15 = 3900$

Amount financed: $26000 - 3900 = 22100$

Interest: $22100 \times 0.12 = 2652$

Amount owed: $22100 + 2652 = \$24752$

monthly payments over 2 years $\rightarrow 24$ payments

$= \frac{24752}{24} = \$1031.33$

12. What is the total interest paid on a \$650 000 mortgage at 6.5% compounded monthly over 30 years? (2 marks)

$i = (1 + \frac{r}{2})^k - 1$
 $= (1 + \frac{0.065}{2})^{12} - 1$
 $= 0.00534474$

$E = \frac{L \cdot i (1+i)^{12n}}{(1+i)^{12n} - 1}$

$= \frac{650000 \times 0.00534474 (1 + 0.00534474)^{12 \cdot 30}}{(1 + 0.00534474)^{12 \cdot 30} - 1}$

$= \frac{2367246918}{5.81402232} = \4071.62 monthly payments

total: $4071.62 \times 12 \times 30 = \$1,465,783.20$

interest $1,465,783.20 - 650,000 =$

total interest $\$815,783.20$

0.15

13. A house sells for \$720 000 and a 15% down payment is made. A mortgage was secured at 5.4% over 20 years.

a. Find the down payment. (0.5 mark)

$$720000 \times 0.15 = \$108000$$

b. Find the amount of the mortgage. (0.5 mark)

$$720000 - 108000 = \$612000$$

c. Find the monthly payment. (1 mark)

$$\begin{aligned} i &= \left(1 + \frac{r}{2}\right)^{\frac{1}{6}} - 1 \\ &= \left(1 + \frac{0.054}{2}\right)^{\frac{1}{6}} - 1 \\ &= 0.004450194 \end{aligned}$$

$$\begin{aligned} E &= \frac{L \cdot i (1+i)^{12 \cdot n}}{(1+i)^{12 \cdot n} - 1} = \frac{(612000)(0.00445)(1+0.00445)^{12 \cdot 20}}{(1+0.00445)^{12 \cdot 20} - 1} \\ &= \frac{7905.8416}{1.962809267} \rightarrow \$4154.84 \end{aligned}$$

d. Find the total cost of the mortgage. (1 mark)

$$4154.84 \times 12 \times 20 = \$997160.92$$

e. Find the total interest paid. (0.5 mark)

$$997160.92 - 612000 = \$385160.92$$

f. Find the total cost of the house (including the down payment). (0.5 mark)

$$997160.92 + 108000$$

$$= \$1105160.92$$

