

Period: _____

Name: KEY

8.1-8.3 Worksheet

1. Kayla is purchasing a new fridge that costs \$6500. She has two different options to finance the purchase and she 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?

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

52 times a year!

Option A: Finance the purchase through the store at an interest rate of 10%, compounded semi-monthly. → 24 times/year! (twice a month × 12 months)

Option B: Finance the purchase with a line of credit at an interest rate of 9.5%, compounded weekly.

$$A) \quad A = 6500 \left(1 + \frac{0.10}{24}\right)^{24 \times 1}$$

$$A = 6500 (1.0041667)^{24}$$

$$A = 6500 (1.1049413)$$

$$A) \quad A = \$7182.12$$

$$B) \quad A = 6500 \left(1 + \frac{0.095}{52}\right)^{52 \times 1}$$

$$A = 6500 (1.00182692)^{52}$$

$$A = 6500 (1.09956355)$$

$$B) \quad A = \$7147.16$$

* Option B is the better deal, by \$34.96

$$\$7182.12 - 7147.16$$

2. Determine the **interest rate** of a \$9000 15-year simple interest investment if the future value of the investment is \$15500.

(round to 2 dec. places)

$$A = P(1 + r \cdot t)$$

$$15500 = 9000(1 + r(15))$$

$$15500 = 9000(1 + 15r)$$

$$15500 = 9000 + 135000r$$

$$\frac{6500}{135000} = \frac{135000r}{135000}$$

$$0.0481 = r$$

interest rate

$$r = 4.81\%$$

3. Determine the **future value** of quarterly deposits of \$850 into an account that pays 7.2% interest, compounded quarterly, for 25 years. (2 marks)

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

$$= \frac{850 \left[\left(1 + \frac{0.072}{4}\right)^{4 \times 25} - 1 \right]}{\frac{0.072}{4}}$$

$$= \frac{850 (4.953574603)}{0.018} = \$233,918.80$$

↳ future value

4. Jonny must now pay $A = \$40,000$ to pay off his bank loan, which he borrowed $t = 8$ years ago. The loan was compounded semi-annually at an interest rate of 6.3%. How much did Jonny originally borrow? $n = 2$ $r = 0.063$

$$A = P(1 + \frac{r}{n})^{nt} \rightarrow 40000 = P(1 + \frac{0.063}{2})^{2 \times 8} (=16)$$

$$40000 = P(1.642508845)$$

$$\frac{40000}{1.642508845} = \frac{P}{1.642508845}$$

$$P = \$24,352.99$$

Jonny originally borrowed $\$24,352.99$

5. Randy estimates that he will need $A = \$4,200$ for a vacation he is planning for 100 weeks from now. How much money should he invest now, at 5.2% simple interest, to meet his goal? $P = ?$ $r = 0.052$

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

$$4200 = P(1 + (0.052)(\frac{100}{52}))$$

$$\frac{4200}{1.1} = \frac{P}{1.1}$$

$$P = \$3,818.18$$

Randy should invest $\$3,818.18$ now to meet his goal

$$100 \text{ wks} = \frac{100}{52} \text{ yrs!}$$

6. Annie receives a $t = 2$ -year $P = \$900$ discount loan at 4% simple interest. Find the actual interest rate? $r = 0.04$

① $I = Prt$

$$I = (900)(0.04)(2)$$

$$I = \$72$$

② Amount received:

$$P - I$$

$$= 900 - 72$$

$$= \$828$$

↓
actual principal! (P)

③ Actual rate

$$I = Prt$$

$$72 = (828)r(2)$$

$$\frac{72}{1656} = \frac{1656r}{1656}$$

$$r = 0.0435 = 4.35\%$$

actual rate

7. What is a better investment: 6.7% compounded monthly or 6% compounded weekly?

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

a) $r = 0.067$

$n = 12$

b) $r = 0.06$

$n = 52$

$$a) E = (1 + \frac{0.067}{12})^{12} - 1$$

$$= (1.069096235) - 1$$

$$E = 0.0691$$

$$\times 100 \rightarrow = 6.91\%$$

$$b) E = (1 + \frac{0.06}{52})^{52} - 1$$

$$= (1.06179982) - 1$$

$$E = 0.0618$$

$$\times 100 \rightarrow = 6.18\%$$

∴ option a) 6.7% is a better investment

8. The stock information for TD Bank:

STOCK	HIGH	LOW	DIV	YLD%	P/E	VOL(1000s)	CLOSE	NetCHG
TD	66.99	67.11	1.64	----	----	2950	66.95	-0.04

a. What was the highest price that the stock sold for during the last 52 weeks? \$66.99

b. What was the lowest price the stock sold for during the last 52 weeks? \$67.11

c. What was the amount of dividend per share that the company paid last year? \$1.64

d. If you own 950 shares, how much in dividends did you make last year? $950 \times 1.64 = \boxed{\$1558}$

e. How many shares were traded yesterday? $2950 \times 1000 = \boxed{2,950,000}$

f. What was the closing price of the stock yesterday? \$66.95

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

$$\text{P/E ratio} = \frac{\text{yesterday's closing price}}{\text{annual earning per share}} = \frac{\$66.95}{\$8.29} = \boxed{8.08}$$

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

$$\begin{aligned} &= \text{yesterday's closing price} - \text{net change} \\ &= \$66.95 - (-0.04) = \$66.95 + 0.04 \\ &= \boxed{\$66.99} \end{aligned}$$

i. Find the yield for ~~TD Bank~~ ^{TD Bank} Stock.

$$\text{Yield} = \frac{\text{annual dividend per share}}{\text{closing price of stock}} = \frac{1.64}{66.95} = 0.0245 \rightarrow \boxed{2.45\%}$$

j. If you purchased 700 shares of ~~TD Bank~~ ^{TD Bank} at the low price in the last 52 weeks and sold at the close price, what profit did you make? (omit dividends)

omit j)

TURN OVER

9. An investor purchased 350 shares of stock for \$52.40 per share, and later sold them for \$56.50. The broker's commission was 1.9% on both the purchase and selling price. Find the amount the investor made or lost on the stock.

Buying:

cost

$$350 \times 52.40 \\ = \$18340$$

commission

$$18340 \times 0.019 \\ = \$348.46$$

total:

$$18340 + 348.46 \\ = \underline{\underline{\$18688.46}}$$

* add
(+)
commission
when buying!

Selling:

price

$$350 \times 56.50 \\ = \$19775$$

1.9%

$$19775 \times 0.019 \\ = \$375.73$$

total:

$$19775 - 375.73 \\ = \underline{\underline{\$19399.27}}$$

* subtract
(-)
commission
when selling!

made
lost

$$= \text{selling total} - \text{buying total} \\ = \$19399.27 - 18688.46$$

made a profit of \\$710.81