

FINANCE Practice

Name _____

You can use your TI-App to check answers, but you are expected to show work.

- ① Takaya invested 1000 JPY at 6.3% ^{monthly} comp. interest for 15 years. Morimi invested 900 JPY at 6.3% interest compounded quarterly for 15 years. Who had more money at the end of the 15th year? Justify your answer clearly.

Takaya $FV = 1000 \left(1 + \frac{6.3}{100(12)}\right)^{(12 \times 15)}$
 $= 2566.46 \text{ JPY}$

Morimi $FV = 900 \left(1 + \frac{6.3}{100(4)}\right)^{(4 \times 15)}$
 $= 2298.54 \text{ JPY}$

So Takaya had more.

- ② Bobby is spending a year travelling from America to France and Britain. Consider the following exchange rates.

1 US dollar (USD) = 0.983 Euros
 1 British Pound (GBP) = 1.59 Euros

$500 \text{ USD} \times \frac{0.983 \text{ Euros}}{1 \text{ USD}} = 491.50 \text{ Euros}$

- (a) Bobby changes 500 USD into Euros.
 (i) Calculate how many Euros he receives.

He spends 328 Euros in France and changes the remainder into GBP. but this time is charged a 3% commission.

- (ii) Calculate how many GBP he receives.

491.50
 $- 328$
 $\hline 163.5 \text{ Euros left}$

$3\% \text{ of } 163.5 = 4.9 \text{ euro commission}$

$(163.5 - 4.9) \times \frac{1 \text{ GBP}}{1.59 \text{ Euros}} = 99.75 \text{ GBP}$

While in Britain Bobby decides to put this money in a bank that pays 6% per annum, compound yearly and he gets a part-time job to cover his expenses. Bobby remains in Britain for six months.

- (b) Calculate how much interest he receives for the six months.

$99.75 \left(1 + \frac{6}{100(0.5)}\right)^{(1 \times 0.5)}$

102.70 GBP

3) At what interest rate, compounded annually, would you need to invest \$100 in order to have \$125 in 2 years?

$$FV = C \left(1 + \frac{r}{100}\right)^{nt}$$

Working:

$$125 = 100 \left(1 + \frac{r}{100}\right)^2$$

$$1.25 = \left(1 + \frac{r}{100}\right)^2$$

$$\sqrt{1.25} = 1 + \frac{r}{100}$$

$$\sqrt{1.25} - 1 = \frac{r}{100}$$

Answer:

$$r = 11.8\%$$

4) Bob invests 600 EUR in a bank that offers a rate of 2.75% compounded annually. The interest is added on at the end of each year.

(a) Calculate how much money Bob has in the bank after 4 years.

(b) Calculate the number of years it will take for the investment to double.

Ann invests 600 EUR in another bank that offers interest compounded annually. Her investment doubles in 20 years.

(c) Find the rate that the bank is offering.

a) $FV = 600 \left(1 + \frac{2.75}{100}\right)^4 = 668.77 \text{ EUR}$

b) IF DOUBLED, initial investment would be 1200 EUR

$$1200 = 600 \left(1 + \frac{2.75}{100}\right)^n$$

$$2 = \left(1 + \frac{2.75}{100}\right)^n$$

Using logs or graphing

$$n \approx 25.6 \text{ years}$$

c) $1200 = 600 \left(1 + \frac{r}{100}\right)^{20}$

$$2 = \left(1 + \frac{r}{100}\right)^{20}$$

$$\sqrt[20]{2} = 1 + \frac{r}{100}$$

$$\frac{r}{100} = \sqrt[20]{2} - 1$$

$$r = 3.5\%$$

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A family in Malaysia received a gift of AUD \$ 4000 from a cousin living in Australia.

The money was converted to Malaysian Ringgit. One Ringgit can be exchanged for 0.4504 AUD.

(a) Calculate the amount of Ringgit received.

$$4000 \text{ AUD} \times \frac{1 \text{ RIN}}{0.4504 \text{ AUD}} = \underline{\underline{8880 \text{ RINGGIT}}}$$

The money was invested for 2 years and 6 months at 5.2 % p.a. compounding monthly.

(b) Calculate the amount of interest earned from this investment. Give your answer to the nearest Ringgit.

$n = 12 \text{ yr} \times 6 \text{ m} = 2.5 \text{ year}$

Assuming 8880 RINGGIT

$$FV = 8880 \left(1 + \frac{5.2}{100(12)}\right)^{(2.5 \times 12)}$$

$$= 10,109.96 \text{ RINGGIT} \rightarrow \text{nearest RINGGIT}$$

10,110 ringgit

$\frac{10,110 - 8,880}{8,880} = 13.85\%$
\$2,230 interest

6

Mario has spent \$ 40000 to buy some land. The land increases in value by 5 % each year.

(i) What is the value of the land after the end of five years?

At the end of five years, Mario sells the land. He pays 1 % tax on the sale and spends the rest of the money on a car. The car then loses value at a rate of \$ 2500 every year.

(ii) How much tax does Mario pay?

(iii) How much is the car worth five years after Mario buys it?

Working:

(i) can use $FV = a \left(1 + \frac{r}{100}\right)^n$ or $y = ab^x$
 $= 40000 \left(1 + \frac{5}{100}\right)^5$ or $y = 40000(1.05)^5 = 51,051.26$

(ii) TAX
1% of 51,051.26
is \$ 510.51

Answers:

- (i) \$51,051
- (ii) \$ 510.51 or \$511
- (iii) \$ 38,040

(iii)
$$\begin{array}{r} 51,051 \\ - 511 \\ \hline 50,540 \\ \text{after taxes} \end{array}$$

Buys car valued at \$ 50,540

depreciates linearly

$$FV = 50540 - 5(2500) = \$ 38,040$$

7

John invests X USD in a bank. The bank's stated rate of interest is 6% per annum, compounded monthly.

(a) Write down, in terms of X , an expression for the value of John's investment after one year.

$$FV = C \left(1 + \frac{r}{100k}\right)^{nk}$$

$$FV = X \left(1 + \frac{6}{100 \cdot 12}\right)^{12}$$

$$r = 6$$

$$k = 12$$

$$n = 1$$

$$FV = X \left(1 + \frac{6}{1200}\right)^{12}$$

(b) What rate of interest, when compounded annually (instead of monthly) will give the same value of John's investment as in part (a)? Give your answer correct to three significant figures.

Working:

if annually r would be $X \left(1 + \frac{r}{100}\right)^1$

set them equal to each other

$$X \left(1 + \frac{6}{1200}\right)^{12} = X \left(1 + \frac{r}{100}\right)^1$$

Solve for r

Answers:

- (a) $X \left(1 + \frac{6}{1200}\right)^{12}$
- (b) 6.17%

$$\left(1 + \frac{6}{1200}\right)^{12} = 1 + \frac{r}{100}$$

$$\left(1 + \frac{6}{1200}\right)^{12} - 1 = \frac{r}{100}$$

$$r \approx 6.17$$