

Date _____

Name KEY9.2.2 Compound Interest Practice

Show all your work.

1. A coin had a value of \$1.17 in 2010. The value has been increasing by 9% per year. What would the value be 5 years later? 15 years later?

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

$$A_5 = 1.17(1 + \frac{0.09}{1})^{(1)(5)}$$

$$= \$1.80$$

$$A_{15} = 1.17(1 + \frac{0.09}{1})^{(1)(15)}$$

$$= \$4.26$$

2. Gina deposited \$1500 into an account that pays 3% per annum compounded quarterly. What will be her balance in 2 years?

h=4

~~$$A = 1500$$~~

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

$$= 1500(1 + \frac{0.03}{4})^{(4)(2)}$$

$$= \$1592.40$$

3. The Garcias have \$12 000 in a savings account. The bank pays 3.5% per annum on savings accounts, compounded monthly. Find the amount of interest earned after 3 years.

n=12

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

$$= 12000(1 + \frac{0.035}{12})^{(12)(3)}$$

$$= \$13326.49$$

$$I = A - P$$

$$= 13326.49 - 12000$$

$$= \$1326.49$$

4. Determine the amount of interest earned on a balance of \$2500 invested at 5.2% per annum compounded monthly for 4 years.

n=12

$$I = A - P$$

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

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

$$= 2500[(1 + \frac{0.052}{12})^{(12)(4)} - 1]$$

$$= \$576.65$$

5. Determine the interest earned on a \$100 000 investment paying 4.85% per annum compounded semi-monthly for 12 years.

$$\begin{aligned}
 I &= P \left[\left(1 + \frac{r}{n} \right)^{nt} - 1 \right] \\
 &= 100000 \left[\left(1 + \frac{0.0485}{24} \right)^{(24)(12)} - 1 \right] \\
 &= \$78\,856.34
 \end{aligned}$$

6. The Fresh and Green Company has a savings plan for employees. If an employee deposits \$1000, they will pay 8% per annum compounded quarterly. How much would an employee have after 5 years?

$$\begin{aligned}
 \text{Answer } A &= P \left(1 + \frac{r}{n} \right)^{nt} \\
 &= 1000 \left(1 + \frac{0.08}{4} \right)^{(4)(5)} \\
 &= \$1485.95
 \end{aligned}$$

7. Using the information in #6, how much would the employee have after 35 years?

$$\begin{aligned}
 &= 1000 \left(1 + \frac{0.08}{4} \right)^{4(35)} \\
 &= ~~\$15\,996.47~~ \\
 &= \$15\,996.47
 \end{aligned}$$

8. Mr. & Mrs. Boyce bought a house for \$96 000 in 1995. Real estate values in their area increase approximately 4% per year. What is the value of the house in 2025?

$$\begin{aligned}
 t &= 2025 - 1995 = 30 \text{ yrs.} & A &= 96000 \left(1 + \frac{0.04}{1} \right)^{(1)(30)} \\
 & & &= \$311\,366.16
 \end{aligned}$$

9. Determine the interest earned on a \$500 investment paying 4.25% per annum compounded weekly for 2 years.

$$\begin{aligned}
 I &= P \left[\left(1 + \frac{r}{n} \right)^{nt} - 1 \right] \\
 &= 500 \left[\left(1 + \frac{0.0425}{52} \right)^{(52)(2)} - 1 \right] \\
 &= \$44.34
 \end{aligned}$$

10. Determine the final value of a \$300 investment paying 6.75% per annum compounded semi-annually for 20 years.

$$\begin{aligned} A &= P \left(1 + \frac{r}{n} \right)^{nt} \\ &= 300 \left(1 + \frac{0.0675}{2} \right)^{(2)(20)} \\ &= \$1131.73 \end{aligned}$$

11. The Fishers bought a condo worth \$110 000 in 1997. If its value appreciates 6.7% per year, what will it be worth in 2027?

$$t = 2027 - 1997 = 30 \text{ yr.}$$

$$\begin{aligned} A &= P \left(1 + \frac{r}{n} \right)^{nt} \\ &= 110000 \left(1 + \frac{0.067}{1} \right)^{(1)(30)} \\ &= \$769\,706.70 \end{aligned}$$

12. Determine the interest owed on a loan of \$6500 if you are charged 4.2% per annum compounded monthly for 3 years.

$$\begin{aligned} I &= P \left[\left(1 + \frac{r}{n} \right)^{nt} - 1 \right] \\ &= 6500 \left[\left(1 + \frac{0.042}{12} \right)^{(12)(3)} - 1 \right] \\ &= \$871.21 \end{aligned}$$

13. Determine the interest earned on an investment of \$500 if you are receiving 3.8% per annum compounded monthly for 40 years.

$$\begin{aligned} I &= P \left[\left(1 + \frac{r}{n} \right)^{nt} - 1 \right] \\ &= 500 \left[\left(1 + \frac{0.038}{12} \right)^{(12)(40)} - 1 \right] \\ &= \$1780.63 \end{aligned}$$

