

NOW YOU TRY STUDENT WORKSHEET
9th - 10th Grade

ANNUAL INTEREST

1. Taylor wants to invest her **\$7,500** college fund at her bank. She picks an **annual certificate of deposit** that will pay her **3%** annually. (Remember, **3% interest** is .03 when written as a decimal.)

- A. How much **interest** will Taylor earn for the year?

$$\text{Interest} = \$7,500 \times .03 = \$225$$

- B. What will Taylor's **balance** be when the certificate is over?

$$\text{Balance} = \text{Principal} + \text{Interest}$$

$$\text{Balance} = \$7,500 + (\$7,500 \times .03)$$

$$\text{Balance} = \$7,500 + \$225 = \$7,725$$

2. Now, if Taylor decides to leave her money in the bank for three years:

- A. What is the **term** of Taylor's **certificate of deposit**?

Three years

- B. Fill in the table to find out how Taylor's investment grows:

	Beginning Balance	3% Interest	Ending Balance
Year 1	\$7,500	\$225	\$7,725
Year 2	\$7,725	\$231.75	\$7,956.75
Year 3	\$7,956.75	\$238.70	\$8,195.45

ANNUAL vs. QUARTERLY INTEREST

3. Taylor wants to invest her **\$7,500** college fund at her bank. She decides to open a **statement savings account, compounding quarterly**, instead of an **annual certificate of deposit**. This statement savings account will pay her a **3% APR**. (Remember, **3% interest** is .03 when written as a decimal.)

A. How often does Taylor's account compound?

Quarterly - four times

B. What will Taylor's 1st quarter **interest** payment be?

$$\text{Interest} = (\$7,500 \times .03) / 4 = \$225 / 4 = \$56.25$$

C. What will Taylor's **balance** be when the year is over?

	Beginning Balance	3% Interest	Ending Balance
1 st Quarter	\$7,500	\$56.25	\$7,556.25
2 nd Quarter	\$7,556.25	\$56.67	\$7,612.92
3 rd Quarter	\$7,612.92	\$57.10	\$7,670.02
4 th Quarter	\$7,670.02	\$57.53	\$7,727.55

D. What **APY** will Taylor's statement savings account earn her for the year?

$$\text{APY} = (227.55) / \$7,500 = .03034 = 3.034\%$$

Compound Interest Formula

There is a formula you can use to calculate the ending balance of an investment if you know certain facts about the investment, such as: **principal**, **APR**, **compounding periods**, and the number of years the investment lasts.

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

Where: A = Accumulated Balance

P = Principal

r = APR expressed as a decimal

n = number of compounding periods/year

t = number of years the investment lasts

Let's look again at question 3 on page 2:

Taylor wants to invest her **\$7,500** college fund at her bank. She decides to open a **statement savings account, compounding quarterly**, instead of an **annual certificate of deposit**. This statement savings account will pay her a **3% APR**. (Remember, **3% interest** is .03 when written as a decimal.)

4. Complete Taylor's information below.

Principal = \$7,500

APR = 3% = .03

Number of compounding periods = 4

Number of years the investment lasts = 1

Use the **compound interest formula** to compute her balance at the end of the year.

$$\begin{aligned} A &= P\left(1 + \frac{r}{n}\right)^{nt} = \$7,500\left(1 + \frac{.03}{4}\right)^{4 \times 1} = \$7,500(1 + .0075)^4 \\ &= \$7,500(1.0075)^4 = \$7,500(1.03034) = \$7,727.55 \end{aligned}$$

How does your answer compare to the answer you got in question 3 when you completed the table?

Both answers match and can be calculated correctly using the formula or doing the calculations by hand.

QUARTERLY vs. MONTHLY INTEREST

Andrea wants to invest **\$2,000** at her bank. She decides to open a **money market savings account**, compounding monthly, instead of a **statement savings account**. This **money market savings account** will pay her a **3% APR**. (Remember, **3% interest** is .03 when written as a decimal.)

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

5. Complete Andrea's information below.

Principal = \$2,000

APR = 3% = .03

Number of compounding periods = 12

Number of years the investment lasts = 1

Use the **compound interest formula** to compute her balance at the end of the year:

$$\begin{aligned} A &= P\left(1 + \frac{r}{n}\right)^{nt} = \$2,000\left(1 + \frac{.03}{12}\right)^{12 \times 1} = \$2,000(1 + .0025)^{12} \\ &= \$2,000(1.0025)^{12} = \$2,000(1.03042) = \$2,060.84 \end{aligned}$$

- A. What will Andrea's **money market savings account balance** be at the end of the year?

\$ 2,060.84

- B. What **APY** will Andrea's **money market savings account** earn her for the year?

$$APY = (60.84) / \$2,000 = .03042 = 3.042\%$$