Name **9th - 10th Grade Answer Key** Date _____

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?

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

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

$$Balance = Principal + Interest$$
$$Balance = \$7{,}500 + (\$7{,}500 \times .03)$$
$$Balance = \$7{,}500 + \$225 = \$7{,}725$$

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**

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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?

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

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

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

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

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

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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.

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

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.

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

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.

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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.)

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

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:

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

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?

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