**Compound Interest Formula**

The total amount of an investment, $A$, earning compound interest is

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

where $P$ is the principal, $r$ is the annual interest rate, $n$ is the number of times interest is compounded per year, and $t$ is the time in years.

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**Find the final amount for each investment.**

1. $1000$ at $6\%$ interest compounded annually for $20$ years
2. $1000$ at $6\%$ interest compounded semiannually for $20$ years
3. $750$ at $10\%$ interest compounded quarterly for $10$ years
4. $750$ at $5\%$ interest compounded quarterly for $10$ years
5. $1800$ at $5.65\%$ interest compounded daily for $3$ years
6. $1800$ at $5.65\%$ interest compounded daily for $6$ years

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**INVESTMENTS** The final amount for $5000$ invested for $25$ years at $10\%$ annual interest compounded semiannually is $57,337$.

a. What is the effect of doubling the amount invested?
b. What is the effect of doubling the annual interest rate?
c. What is the effect of doubling the investment period?
d. Which of the above has the greatest effect on the final amount of the investment?

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**Continuous Compounding Formula**

If $P$ dollars are invested at an interest rate, $r$, that is compounded continuously, then the amount, $A$, of the investment at time $t$ is given by

$$A = Pe^{rt}.$$

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**INVESTMENTS** Sharon invests $2500$ at an annual interest rate of $9\%$. How much is the investment worth after $10$ years if the interest is compounded continuously?

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**INVESTMENTS** An investment of $1500$ earns an annual interest rate of $8.2\%$. Compare the final amounts after $5$ years for interest compounded quarterly and for interest compounded continuously.