Bellwork   Alg 2   Monday, March 2, 2020

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

1. You invest $25,000 for 20 years in an account that pays 9% annual interest. Find the difference between the amount of money you'll end up with if interest is compounded quarterly verses compounded continuously. Round to the nearest penny.

2. Find the equation of the exponential function that passes through the following two points:
$(6, 3280.5)$ & $(8, 7381.125)$

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1. You invest $25,000 for 20 years in an account that pays 9% annual interest. Find the difference between the amount of money you'll end up with if interest is compounded quarterly verses compounded continuously. Round to the nearest penny.

Compounded Quarterly

$P = 25,000$
$r = .09$
$n = 4$
$t = 20$

$A = 25,000\left(1 + \frac{.09}{4}\right)^{4 \cdot 20}$

$A = {}^{\$}148,253.63$

Compounded Continuously

$P = 25,000$
$r = .09$
$t = 20$

$A = 25,000\, e^{.09 \cdot 20}$

$A = \$ 151,241.19$

Difference $= 151,241.19 - 148,253.63$

$= 2987.56$

$\boxed{\text{Compounding Continuously earns an extra } \$ 2987.56}$

2. Find the equation of the exponential function that passes through the following two points:
$(6, 3280.5)$ & $(8, 7381.125)$
 x   y   x   y

$3280.5 = a \cdot b^6$

$a = \dfrac{3280.5}{b^6}$

$a = \dfrac{3280.5}{(1.5)^6}$

$\boxed{a = 288}$

$7381.125 = a \cdot b^8$

$7381.125 = \dfrac{3280.5}{b^6} \cdot b^8$

$\dfrac{7381.125}{3280.5} = \dfrac{3280.5\, b^2}{3280.5}$

$\sqrt{2.25} = \sqrt{b^2}$

$\boxed{b = 1.5}$

$\boxed{y = 288(1.5)^x}$

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