Sec 4.1

-Exponential Applications-

-population growth and loss
-depreciation (vehicles, equipment)
-appreciation (inflation, salary)
-radioactive decay
-decay of medicinal substances in the body
-account growth (money invested in savings, cds)

The equation $P = 7.6(1.0109)^t$ models the world's present population, in billions, where t is years since 2018. What is the world population today; what will it be in 2025?

Let $t = 7$

$P = 7.6(1.0109)^7$

$P \approx 8.199$

Pop $\approx$ 8.199 billion

8,199,000,000 people

If your home is worth \$250,000 and the inflation rate is 2.5%, how much will your home be worth in 15 years?

Use the model

$S = C(1+r)^t$, where C is the current value, r is the inflation rate and S is the value after t years.

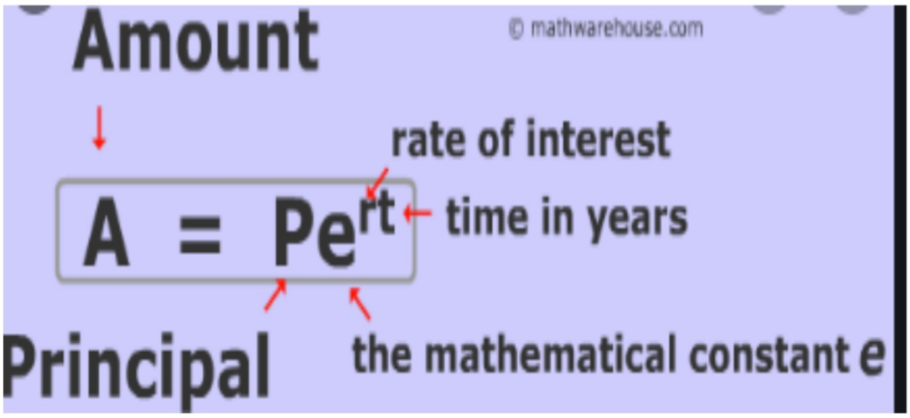
.025 ↗

$$S = C(1+r)^t$$

$$= 250{,}000(1.025)^{15}$$

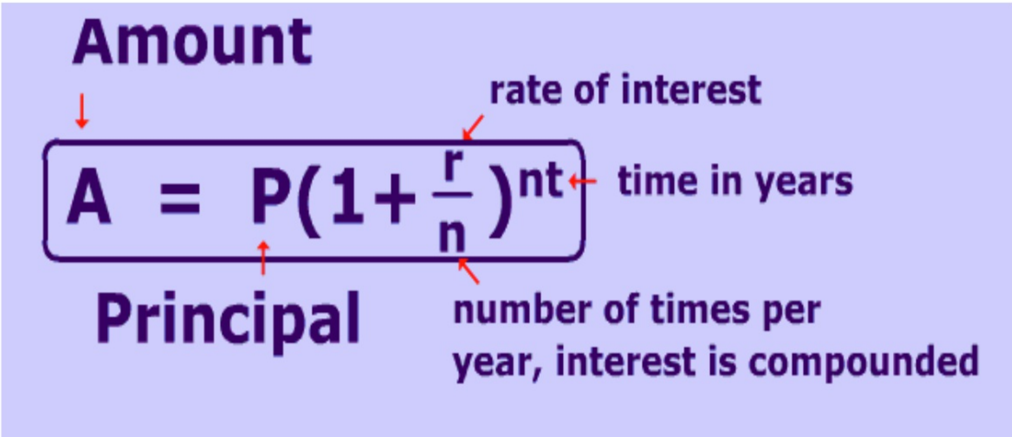
$$\approx \$362{,}074$$

For the scenario on the next screen we will use the Pert formula.



It calculates the amount of money acculumated if it's compounded continuously.

We'll also use the compound interest formula.



It obtains the later amount if interest is compounded more than once a year, but not continuously.

You are investing $8000 for 6 years. One account pays 7%, compounded monthly. The other pays 6.85%, compounded continuously. Which is the better investment?

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

$$= 8000\left(1+\frac{.07}{12}\right)^{12(6)}$$

$$\approx \$12{,}160.8$$

↑ 7% monthly pays more

$$A = Pe^{rt}$$

$$= 8000e^{.0685(6)}$$

$$12{,}066.6$$

annually- 1

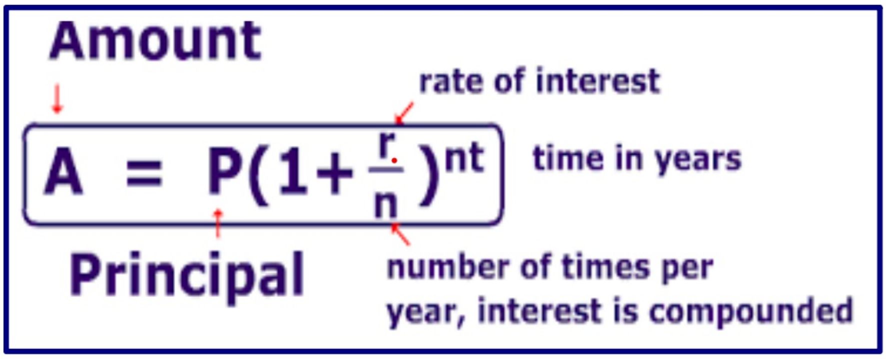
semi-annually- 2

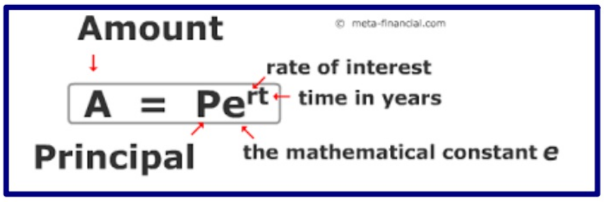
quarterly- 4

monthly- 12

daily- 365

continuously-





various
"n" values

Suggested Practice
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53,55,65,66,67,73

53. a. $13,116.51
b. $13,140.67
c. $13,157.04
d. $13,165.31

55. 7%, monthly

65. a. 574 million
b. 1148 million
or 1,148,000,000
or 1.1 trillion

66. f(80) = 157.49
so, no, not safe in 2066

67. $832,744

73. a. 100%
b. 68.5%
c. 30.8%
d. 20%