

Bellwork Friday, February 28, 2020

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

1. You invest \$15,000 in an account that pays 6% annual interest. How much will you have after 20 years if the interest is compounded weekly?

2. You invest \$40,000 in an account that pays 8% annual interest. If the interest is compounded annually find the number of years, to the nearest tenth, it will take for your investment to reach \$100,000.

3. The half-life of a certain compound is 50 minutes. If you start with 150 kg at 1:00pm, how much of the compound will remain at 8:15 pm. Round to the nearest hundredth.

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ANSWERS

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

1. You invest \$15,000 in an account that pays 6% annual interest. How much will you have after 20 years if the interest is compounded weekly?

$P = 15,000$ $r = .06$
 $n = 52$ $t = 20$

$$A = 15,000 \left(1 + \frac{.06}{52}\right)^{52 \cdot 20}$$

$A = \$49,767.31$

2. You invest \$40,000 in an account that pays 8% annual interest. If the interest is compounded annually find the number of years, to the nearest tenth, it will take for your investment to reach \$100,000.

$P = 40,000$ $r = 0.08$ $n = 1$ $t = ?$

$A = 100,000$

$$100,000 = 40,000 \left(1 + \frac{.08}{1}\right)^{1 \cdot t}$$

$$100,000 = 40,000 (1 + .08)^t$$

$$100,000 = \underline{40,000 (1.08)^t}$$

(1) you could enter this equation into $y =$ and use the table to find the value of t that gets as close to 100,000 as possible

$t = 11.91 \text{ yrs}$

OR
(2) graph one side as y_1 and the other side as y_2 = find pt of intersection

3. The half-life of a certain compound is 50 minutes. If you start with 150 kg at 1:00pm, how much of the compound will remain at 8:15 pm. Round to the nearest hundredth.

$y = 150(.5)^x$ $x = \# \text{ of } 50 \text{ min half-lives:}$

$1:00 \text{ pm to } 8:15 \text{ pm} = 7 \text{ hrs } 15 \text{ min}$
 $= 7(60) + 15$
 $= 435 \text{ min}$
 $x = \frac{435}{50} = 8.7$

$y = 150(.5)^{8.7}$

$y = 0.36 \text{ kg}$