D.5 - Day 1 - Log/Exponential Models and Applications

Exponential Growth/Decay Model: $y = a(1 \pm r)^x$

- a: initial value/amount
- r: rate of growth or decay (positive) (negative)
- x: number of time periods (t)

Ex.1 Write an exponential function modeling this situation and solve.

You invested $1000 into a savings account at the end of sixth grade. The account pays 5% annual interest. How much money will be in the account after seven years? *(Round answer to the nearest cent)*

$5\% \rightsquigarrow r = .05$

$y = 1000(1+.05)^7$

$y = \$1407.10$

May 8-10:05 AM

Ex.2 Write an exponential function modeling this situation and solve.

The amount of zombies in the U.S. is doubling every day. The outbreak is thought to have started with 4 zombies in Dallas, TX. If this trend continues, how many zombies will there be in 25 days?

$a = 4$

$t = 25$

$r = 100\% \rightsquigarrow 1$

$y = ?$

$y = 4(1+1)^{25}$

$y = 134{,}217{,}728$ zombies

May 8-10:15 AM

Ex.3 Write an exponential function modeling this situation and solve.

There is currently a population of 5,200 polar bears in a certain area in the Arctic Americas. That population has been decreasing by about 3.5 % each year. If this trend continues, how many will remain in 50 years? *(Round answer to the nearest whole number)*

$a = 5200$

$r = .035$

$t = 50$

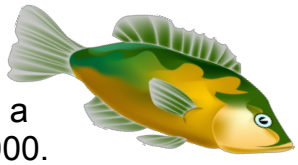
$y = ?$

$y = 5200(1 - .035)^{50}$

$y \approx 876$ bears

May 8-10:15 AM

Ex.4 Write an exponential function modeling this situation and solve.



A certain invasive population of fish were introduced into a lake 45 years ago. The current population is about 200,000. If the estimated breeding rate of this fish is 23% each year, how many fish were initially introduced into the lake 45 years ago? *(Round answer to the nearest whole number)*

$t = 45$

$r = 0.23$

$y = 200{,}000$

$a = ?$

$$\frac{200\,000}{(1+.23)^{45}} = \frac{a\cdot(1+.23)^{45}}{(1+.23)^{45}}$$

18 fish $= a$

May 8-10:19 AM