Welcome to class!

-All cell phones in holder.

Time for a Quick Check-no calculators.

$\log_2 16 + \log_5 125$

$\log_2 16 = x$

$2^x = 16$

$2^x = 2^4$

$\log_2 2^4 + \log_5 5^3$

$4 + 3 = 7$

$4\log_2 2 + 3\log_5 5$

$4 + 3$

7

Applications of LOGS

When applying logs to real-world situations, we will still use the same 4 formulas from last unit.

Growth:	**Decay:**
$A = P(1+r)^t$	$A = P(1-r)^t$
Compound Interest:	**Compounded Continuously:**
$A = P\left(1+\frac{r}{n}\right)^{n \cdot t}$	$A = Pe^{rt}$

Now that we know how to solve logs we will be solving not only for A and P, but for rate (r) and time (t).

Example 1: $500 is deposited in an account that pays 2% annual interest compounded continuously. Approximately how many years will it take for the account to reach $1,000?

$A = Pe^{rt}$

$1000 = 500e^{.02t}$

$2 = e^{.02t}$

$\ln 2 = .02t$

$34.7 = t$

Example 2: A town of 1,000 people is experiencing an increase in population due to several new business openings. If the population increases at a rate of 5% per year, approximately how many years will it take for there to be 20,000 people in the town?

$A = P(1+r)^t$

$20000 = 1000(1+.05)^t$

$20 = (1.05)^t$

$\log_{1.05}(20) = t$

$61.4 = t$

61.4 years

Example 3: You paid $42,550 for a new car. If after 5 years the car is worth $30,000, at what rate does the car decrease?

$A = P(1-r)^t$

$30000 = 42{,}550(1-r)^5$

$\sqrt[5]{.71} = \sqrt[5]{(1-r)^5}$

$.933 = 1-r$

$-1 \quad -1$

$-.067 = -r$

$.067 = r \quad r = 6.7\%$

Example 4: Brian would like to purchase a boat as a graduation present for himself. He deposits $5,000 into an account that pays 7.5% interest compounded quarterly. If Brian needs $50,000 in order to purchase the boat, how long will it take him to save enough money?

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

$50000 = 5000\left(1+\frac{.075}{4}\right)^{4t}$

$10 = (1.01875)^{4t}$

$\log_{1.01875}(10) = 4t$

$30.99 = t$

31 years