January 8

Unit 4 Bare Necessities - Exponents and Logarithms

Rewriting Exponents and Logarithms

EX1. Rewrite $6^3 = 216$ in logarithmic form.

$3 = \log_6 216$

EX2. Rewrite $\log_2 16 = 4$ in exponential form.

$16 = 2^4$

Solving Logarithmic Equations

EX3. $\log_5(3x+11) = 4$

$3x+11 = 5^4$

$3x+11 = 625$

$-11 \quad -11$

$\frac{3x}{3} = \frac{614}{3}$

$x = 204.67$

EX4. $\log 6x - \log 3 = 2$

$\log \frac{6x}{3} = 2$

$\log 2x = 2$

$2x = 10^2$

$\frac{2x}{2} = \frac{100}{2}$

$x = 50$

Solving Exponential Equations

EX5. $5^x = 37$

$\ln 5^x = \ln 37$

$x \cdot \ln 5 = \ln 37$

$\frac{x \cdot \ln 5}{\ln 5} = \frac{\ln 37}{\ln 5}$

$x = 2.24$

EX6. $9^{7x-2} = 3$

$\ln 9^{7x-2} = \ln 3$

$(7x-2) \cdot \ln 9 = \ln 3$

$\frac{(7x-2) \cdot \ln 9}{\ln 9} = \frac{\ln 3}{\ln 9}$

$7x - 2 = .5$

$+2 \quad +2$

$\frac{7x}{7} = \frac{2.5}{7}$

$x = .36$

Exponential Growth and Decay

EX7. Ryan's motorcycle is now worth $2500. It has decreased in value 12% each year since it was purchased. If he bought it four years ago, what did it cost new?

$a = p(b)^t$

$a: 2500$

$p: ?$

$b: 100 - 12 = 88 \div 100 = .88$

$t: 4$

$2500 = p(.88)^4$

$\frac{2500}{.60} = \frac{p \cdot .60}{.60}$

$\$4168.78 = p$

Compound Interest

EX8. What amount will an account have after 18 years if $250 is invested at 5% interest compounded semiannually?

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

$A: ?$

$P: 250$

$r: 5 \div 100 = .05$

$n: 2$

$t: 18$

$A = 250\left(1 + \frac{.05}{2}\right)^{2 \cdot 18}$

$A = \$608.13$