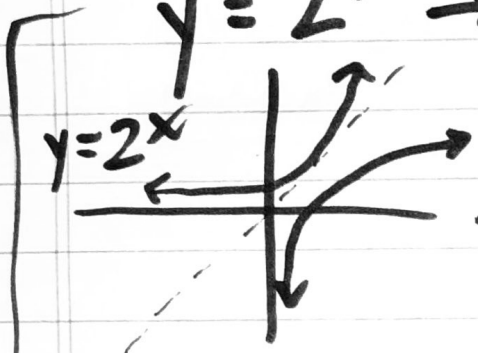
UNIT 2 - LOGARITHMS

$y = 2^x$ → graph inverse?



↳ Inverse eqn.: $x = 2^y$ → to solve for y you need logs!

$\log_2 x = y$

subscript = BASE

EXP FORM ⟷ **LOG FORM**

$a^x = b$ ← EXPONENT ⟷ $\log_a b = x$

BASE ↑ ↑ BASE, exponent

$4^3 = 64$ ⟷ $\log_4 64 = 3$

$2^5 = 32$ ⟷ $\log_2 32 = 5$

$7^{\frac{1}{2}} = \sqrt{7}$ ⟷ $\log_7 \sqrt{7} = \frac{1}{2}$

Simplify | Evaluate.

① $\log_5 25 = x$ - set = x - put in exp.

$5^x = 25$

$5^x = 5^2$

$\boxed{x = 2}$

② $\log_6\left(\frac{1}{36}\right) = x$

$6^x = \frac{1}{36} = \frac{1}{6^2}$

$6^x = 6^{-2} \rightarrow \boxed{x = -2}$

③ $\log_7 1 = x$

$7^x = 1$

$\boxed{x = 0}$

$\boxed{\log_a 1 = 0; \quad a > 0}$

Solve.

① $\log_x 144 = 2$ $x = 12$

② $\log_3 x = -3$ $x = \frac{1}{27}$

③ $\log_{\frac{1}{9}} x = -\frac{1}{2}$ $\left(\frac{1}{9}\right)^{-\frac{1}{2}} = x$

$x = 3$

④ $\log_9 x = 2.5$ $(9)^{\frac{1}{2}} = x = 3$

$x = 243$

$9^{2.5} = x$

$9^{\frac{5}{2}} = x = \left(9^{\frac{1}{2}}\right)^5$

$= 3^5 = 243$