

Day 10

8.5 Solving Exponential & Log Eqs.

- ① Solve. Round to the nearest ten-thousandth.
(4 decimals)

1st:
put in
"log"
form

$$7^{3x} = 20$$

$$\log_7 20 = 3x$$

$$\underline{1.5395} \approx \underline{3x}$$

$$\underline{.5132} \approx x$$

② $3^{x+4} = 101$

$$\log_3 101 = x+4$$

$$\underline{4.20086373} = \underline{x+4}$$

$$.2009 = x$$

③ $6^{2x} - 3 = 18$

1st: get the power alone

$$\textcircled{6^{2x}} = \textcircled{21}$$

2nd: then put in
"LOG" form

$$\log_6 21 = 2x$$

$$\underline{1.6992} = \underline{2x}$$

$$\textcircled{.8496} \approx x$$

Solve using the calculator.

(ex) Solve $6^{2x} = 21$.

$Y_1 = 6^{2x}$ (left side of equation)

$Y_2 = 21$ (right side of the equation)

Adjust window

Graph

$X \approx .8496$

2^{nd} $Trace$ 5: Intersect

move cursor to the point of intersection (or close to it) and hit $enter$ 3 times.

(ex) Solve $11^{6x} = 786$

$Y_1 = 11^{6x}$

$Y_2 = 786$

$X \approx .4634$

$Window:$ X min: -10
X max: 10

y-min: -10
y-max: 1000
y-scl: 50

Solve "Log" eqs.

(ex) $\log_{10}(7-2x) = -1$

1st: put in exponential form

$$10^{-1} = 7-2x$$

$$.1 = 7-2x$$

$$\frac{-6.9}{-2} = \frac{-2x}{-2}$$

$$\boxed{3.45 = x}$$

* always see if it needs "condensed" 1st

(ex) $\log(6) - \log(3x) = -2$

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

$$\log_{10} \frac{2}{x} = -2$$

$$10^{-2} = \frac{2}{x}$$

~~$$.01 = \frac{2}{x}$$~~

$$2(1) \div .01 = \boxed{x = 200}$$

$$\textcircled{\text{ex}} \quad 3 \log X - \log 2 = 5$$

$$\log X^3 - \log 2 = 5$$

$$\log_{10} \frac{X^3}{2} = 5$$

$$10^5 = \frac{X^3}{2}$$

$$100,000 = \frac{X^3}{2}$$

$$\sqrt[3]{200,000} = \sqrt[3]{X^3}$$

$$X \approx 58.4804$$

$$\textcircled{\text{ex}} \quad \log_2 512 = x + 3$$

$$9 = x + 3$$

$$\boxed{6 = x}$$