7-5 Logarithmic Equations Notes

A. Information/Reminders

1. Impossible to take the log of a negative number or zero.
2. When you raise both sides of an equation to $\frac{?}{even\ \#}$ or $\sqrt[even\ \#]{?}$, include $\pm$ in your answer.
3. Check for extraneous solutions whenever raising both sides of an equation to an even power.
4. If the base is not indicated, it's ten.
5. Complete the table below.

Product Property	Quotient Property	Power Property
$\log_b mn = \log_b m + \log_b n$	$\log_b \frac{m}{n} = \log_b m - \log_b n$	$\log_b m^n = n \log_b m$

Unless otherwise stated, round to the nearest tenth.

B. Equations containing variables as the base.

→ Reverse PEMDAS

1. $y^{\frac{3}{4}} - 5 = 1 \approx 10.9$

2. $\sqrt[3]{x^2} - 2 = 2 \pm 8$

C. Equations containing variables as the exponent.

→ Simplify (Get base with exponent alone.)
→ Log **Both** Sides
→ Power Property
→ Solve

1. $2 + 3^x = 82$ ≈4.0

2. $12^{x-1} - 2 = 18$ ≈2.2056 (round to 4 decimal places)

D. Equations containing logs of variables.

→ Shrink Using Properties
→ Rewrite in Exponential Form
→ Solve

1. $\log 6 - \log(3x) = -2$ 200

2. $\log(x + 21) + \log x = 2$ 4 (not -25)