7-6 Common Logarithms

- *solve exponential equations and inequalities using common logarithms*
- *evaluate logarithmic expressions using Change of Base Formula.*
- *A.CED.1*

Common Logarithms: logarithms that have base 10.

- written withou the base subscript:
- used in everyday formulas:
  - pH levels of a substance:
  - pH levels of blood: pH =
  - loudness (in decibels): **L = 10log** $L = 10\log\left(\frac{I}{M}\right)$

$10^{?} = 5$

Use a calculator to evaluate common logs

1. log 6

0.7781

$10^{?} = 6$

2. log .35

-0.4559

$10^{?} = .35$

$10^{0} = 1$

3. log(½)

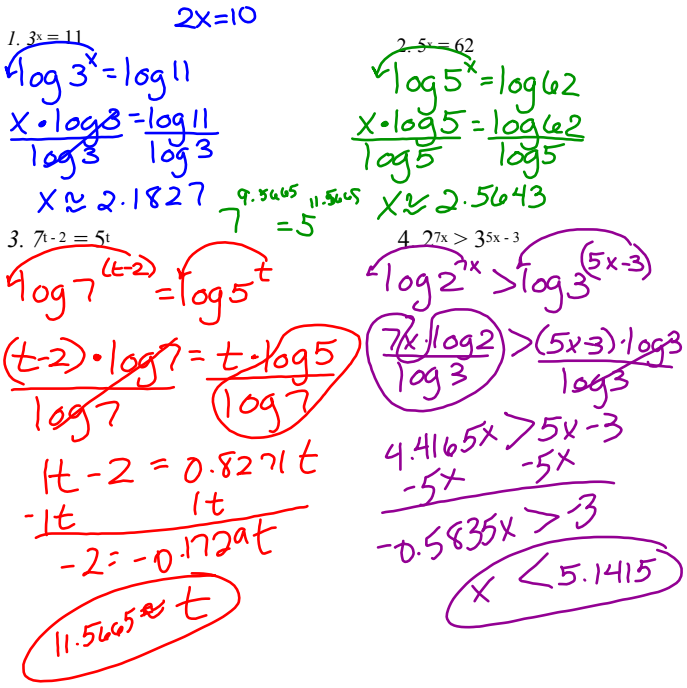
-0.3010

Solving with common logs

- used to solve exponential equations that cannot be written as a common base.

Property of Equality: If $b^y = x$, then $\log b^y = \log x$

Solve the following equations and inequalities.



Changing of a base

- used to change any base to a different base, preferably base 10.
- change of base formula: where a is the original base and b is the new desired base:

Express the following logarithms as a common logarithm. Then give the decimal approximate.

1. $\log_3 18$

$\frac{\log 18}{\log 3} \approx 2.6309$

2. $\log_7 5$

$\frac{\log 5}{\log 7} \approx 0.8451$

3. $\log_2 .45$

$\frac{\log .45}{\log 2} \approx -1.1520$

Page 495,16-22 all
Page 496,23-57 odd