

Solving Logarithmic Equations (Part 1)

These notes are intended as an introduction to section 5.7 (p. 417 – 421) in your workbook. It includes material from section 5.4 (p. 375 – 380). You should review the relevant parts of that section for additional examples.

Solving Simple Logarithmic Equations

To solve a logarithmic equation of the form $y = \log_a x$, change it to exponential form and solve.

Example (not in workbook)

Solve for y :

a) $y = \log_2 16$

b) $y = \log_{\frac{2}{3}} \left(\frac{16}{81} \right)$

Example (not in workbook)

Solve for a :

a) $3 = \log_a 125$

b) $\log_a \frac{2}{3} = -\frac{1}{3}$

c) $\log_a \left(\frac{27}{8} \right) = -\frac{3}{4}$

Example (not in workbook)

Solve for x :

a) $4 = \log_3 x$

b) $-3 = \log_5 x$

Example (5.4 Ex 2, sidebar p. 378)

Evaluate each logarithm.

a) $\log_5 3125$

b) $\log_6 \left(\frac{1}{216} \right)$

c) $\log_8(2\sqrt[3]{2})$

Example (5.4 Ex 3, sidebar p. 379)

To the nearest tenth, estimate the value of $\log_5 100$.

Homework: #4, 7, 9, 13, 15 in the section 5.4 exercises (p. 380 – 385). Answers on p. 386.
Supplemental Worksheet #10

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Solve for x :

1. $\log_5 x = 2$

2. $\log_x 25 = 2$

3. $\log_x 16 = -\frac{4}{3}$

4. $\log_{\frac{1}{2}} \left(\frac{1}{2} \right)^4 = x$

5. $\log_x x^4 = 4$

6. $\log_7 1 = x$

7. $\log_x 16 = \frac{4}{3}$

8. $\log_2 x = 2$

9. $\log_{16} 2 = x$

10. $\log_{32} x = \frac{2}{5}$

11. $\log_5 25^5 = x$

12. $27^{\log_3 9} = x$

13. $\log_6 (\log_2 64) = x$

14. $\log_x \sqrt{5} = \frac{1}{4}$

15. $\log_5 (x^2 - 4x) = 1$