Precalculus
3.5 Practice

Name:
Period:

Don't forget to expand or condense when appropriate, using these properties:

- $\log (ab) = \log a + \log b$
- $\log (a/b) = \log a - \log b$
- $\log a^b = b \log a$
- $\log_b a = \dfrac{\log a}{\log b}$

Use properties of logs to **Expand** the following:

1. $\log_5\left(\dfrac{x^2}{y^3}\right)$

$2\log_5 x - 3\log_5 y$

2. $\log_7\left(\sqrt[4]{x^2yz}\right)$

$\frac{1}{2}\log_7 x + \frac{1}{4}\log_7 y + \frac{1}{4}\log_7 z$

Use properties of logs to **Condense** the following:

1. $\log_3 x + \log_3 y - \log_3 z$

$\log_3 \frac{xy}{z}$

2. $4\log_3 xy + 3\log_3 xy - 8\log_3 xyz$

$\log_3 \frac{x^7y^7}{x^8y^8z^8} = \log_3 \frac{1}{xyz^8}$

Use properties of logs to **solve for x** in the following:

1) $2^x = 32$

$2^x = 2^5$

$x = 5$

2) $8^{x-5} = 16$

$2^{3(x-5)} = 2^4$

$3x - 15 = 4$

$x = \frac{19}{3}$

3) $5^{x-5} = 8$

$x - 5 = \frac{\log 8}{\log 5}$

$x \approx 6.29$

4) $\log_5 125 = x$

$5^x = 5^3$

$x = 3$

5) $\log_6 x = 4$

$x = 6^4$

$x = 1296$

6) $\log_3 (x+2) = 3$

$3^3 = x+2$

$x = 7$

7) $\ln e^4 = x$

$x = 4$

8) $27^{x-4} = \left(\frac{1}{9}\right)^{x-2}$

$3^{3(x-4)} = 3^{-2(x-2)}$

$3x - 12 = -2x + 4$

$x = 16/5$

9) $3 \cdot 4^x - 33 = 15$

$3 \cdot 4^x = 48$

$4^x = 16$

$x = 2$

10) $6 - 4e^x = -42$

$e^x = 12$

$x = \ln 12$

$x \approx 2.48$

11) $\log_4 x = \frac{5}{3}$

$x = 4^{5/3}$

$x \approx 10.08$

12) $\log_x 32 = 2$

$\sqrt{x^2} = \sqrt{32}$

$x = 4\sqrt{2}$

13) $\ln x = 4$

$x = e^4$

$x \approx 54.6$

14) $5 \ln x - 10 = 25$

$5 \ln x = 35$

$\ln x = 7$

$x \approx 1096.63$

15) $\log_3 2187 = x$

$3^x = 2187$

$x = 7$

16) $\log_8 75 = x$

$8^x = 75$

$x \cdot \log 8 = \log 75$

$x \approx 2.08$

17) $\log_7 35 = x$

$\log 7^x = \log 35$

$x \cdot \log 7 = \log 35$

$x \approx 1.83$