Solve each.

a) $\log_4 x^2 + 6 = 9$

$-6 \quad -6$

$\log_4 x^2 = 3$

$4^3 = x^2$

$\sqrt{64} = \sqrt{x^2}$

$\pm 8 = x$

$\frac{2}{2}\log_4 x = \frac{3}{2}$

$\log_4 x = 3/2$

$4^{3/2} = x$

$(\sqrt{4})^3$

$(\pm 2)^3$

$\pm 8 = x$

b) $\log_2 x^3 - 1 = 5$

$+1 \quad +1$

$\log_2 x^3 = 6$

$2^6 = x^3$

$\sqrt[3]{64} = \sqrt[3]{x^3}$

$4 = x$

$\log_2 (x-3)^2 = 8$

$2^8 = (x-3)^2$

$\sqrt{256} = \sqrt{(x-3)^2}$

$\pm 16 = x - 3$

$x = 19, -13$

Solve. $\log 80 - 3 = \frac{1}{2}\log x$

$\log 80 - \frac{1}{2}\log x = 3$

$\log 80 -$

$\log \frac{80}{\sqrt{x}} = 3$

$10^3 = \frac{80}{\sqrt{x}}$

$\frac{1000}{1} = \frac{80}{\sqrt{x}}$

$\frac{80}{1000} = \frac{1000\sqrt{x}}{1000} \Rightarrow \left(\frac{80}{1000}\right)^2 = (\sqrt{x})^2$

$x = .0064$

Solve. $\log_3 (x-5) - 2 = -\log_3 (x+3)$

$\log_3 (x-5) + \log_3 (x+3) = 2$

$\log_3 ((x-5)(x+3)) = 2$

$\log_3 (x^2 - 2x - 15) = 2$

$3^2 = x^2 - 2x - 15$

$-9 \quad\quad -9$

$0 = x^2 - 2x - 24$

$0 = (x-6)(x+4)$

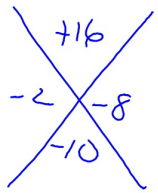
$x = 6, -4$

Solve. $\log_4(10-x)+\log_4 x = 2$

$\log_4((10-x)x) = 2$

$\log_4(10x-x^2) = 2$

$4^2 = 10x-x^2$



$x^2-10x+16=0$

$(x-2)(x-8)=0$

$x=2,8$

Solve. $\log_6(x-13)+\log_6 x = 2$

$\log_6((x-13)x) = 2$

$\log_6(x^2-13x) = 2$

$6^2 = x^2-13x$

$0 = x^2-13x-36$

$b^2-4ac = 313 \Rightarrow x = \frac{13 \pm \sqrt{313}}{2}$

$x = 15.35, -2.35$

Solve. $\frac{1}{3}\log_2 x + \log_2 5 = 4$

$\log_2 \sqrt[3]{x} + \log_2 5 = 4$

$\log_2 5\sqrt[3]{x} = 4$

$2^4 = 5\sqrt[3]{x}$

$16 = 5\sqrt[3]{x}$

$\frac{16}{5} = \sqrt[3]{x}$

$(3.2)^3 = (\sqrt[3]{x})^3$

$x = 32.77$

Solve. $\log_3(x+4) - \log_3 x = 2$

$\log_3\left(\frac{x+4}{x}\right) = 2$

$3^2 = \frac{x+4}{x}$

$x \cdot 9 = \frac{x+4}{x} \cdot x$

$9x = x+4$

$-x \quad -x$

$8x = 4$

$\frac{8x}{8} = \frac{4}{8}$

$x = \frac{1}{2}$

Solve.

$\log_2 x + \log_2(x-2) = 3$

$\log_2(x(x-2)) = 3$

$2^3 = x(x-2)$

$8 = x^2 - 2x$

$0 = x^2 - 2x - 8$

-8, -4, 2, -2

$0 = (x+2)(x-4)$

$x = -2, 4$

$x = 4$

You can now finish Hwk #20

Sec 8-5.

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Problems 7, 12, 37, 40, 43, 47, 82, 100