

Homework

Pg. 382-383 #15-21 odd, 37-41 odd,
49-53 odd, 57-61 odd, 73

$$15) \log_3 \frac{x}{9}$$

$$\log_3 x - \log_3 9$$

$$\log_3 x - 2$$

$$17) \log_4 15 = \log_4 (5 \cdot 3)$$

$$\log_4 5 + \log_4 3$$

$$1.1610 + .7925$$

$$1.9535$$

$$19) \log_2 28 = \log_2 (7 \cdot 4)$$

$$\log_2 7 + \log_2 4 = \log_2 (7 \cdot 2 \cdot 2)$$

$$\log_2 7 + \log_2 2 + \log_2 2$$

$$2.8074 + 2$$

$$2.8074 + 1 + 1$$

$$4.8074$$

$$4.8074$$

$$21) \log_4 60 = \log_4 (3 \cdot 5 \cdot 4)$$

$$\log_4 3 + \log_4 5 + \log_4 4$$

$$.7925 + 1.1610 + 1$$

$$\boxed{2.9535}$$

$$37) 5 \log_2 m - 2 \log_2 n$$

$$\log_2 m^5 - \log_2 n^2$$

$$\log_2 \frac{m^5}{n^2}$$

$$39) 4 \log_b m + \frac{1}{2} \log_b n - 3 \log_b 2p$$

$$\log_b m^4 + \log_b n^{1/2} - \log_b (2p)^3$$

$$\log_b m^4 n^{1/2} - \log_b (2p)^3$$

$$\log_b \frac{m^4 n^{1/2}}{(2p)^3} = \log_b \frac{m^4 n^{1/2}}{8p^3}$$

$$41) 1 - 2\log_7 x$$

$$\log_7 7 - \log_7 x^2$$

$$\log_7 \frac{7}{x^2}$$

$$49) \log_9 9^{11} - \log_4 64$$

$$11 - 3$$

$$\boxed{8}$$

$$51) 6^{\log_6 3} - \log_5 \frac{1}{25}$$

$$3 - (\log_5 1 - \log_5 25)$$

$$3 - (0 - 2)$$

$$3 + 2 = \boxed{5}$$

$$53) \log_3 \frac{1}{9} - 2^{\log_2 3}$$

$$\log_3 1 - \log_3 9 - 3$$
$$0 - 2 - 3$$

$$-2 - 3 = \boxed{-5}$$

$$57) \log_b(x^2 - 15) = \log_b(6x + 1)$$

$$x^2 - 15 = 6x + 1$$

$$\begin{array}{r} -6x - 1 \\ \hline \end{array}$$

$$x^2 - 6x - 16 = 0$$

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

$$x = \boxed{8}, \quad \cancel{-2}$$

$$59) \quad 2 \log_a x + \log_a 2 = \log_a (5x+3)$$

$$\log_a x^2 + \log_a 2 = \log_a (5x+3)$$

$$\log_a 2x^2 = \log_a (5x+3)$$

$$2x^2 = 5x+3$$

$$\underline{-5x-3 \quad -5x-3}$$

$$2x^2 - 5x - 3 = 0$$

$$(2x+1)(x-3) = 0$$

$$x = \cancel{-\frac{1}{2}}, 3$$

$$61) 2 \log_3 x + \log_3 5 = \log_3 (14x+3)$$

$$\log_3 5x^2 = \log_3 (14x+3)$$

$$\begin{array}{r} 5x^2 = 14x+3 \\ -14x-3 \quad -14x-3 \\ \hline \end{array}$$

$$5x^2 - 14x - 3 = 0$$

$$(5x+1)(x-3)$$

$$x = -\frac{1}{5}, 3$$

$$x = \frac{+14 \pm \sqrt{(-14)^2 - 4(5)(-3)}}{2(5)}$$

$$= \frac{14 \pm 16}{10}$$

$$x = -\frac{1}{5}, 3$$

$$73) \log_6 [\log_5 (\log_3 x)] = 0$$

$$6^0 = \log_5 (\log_3 x)$$

$$1 = \log_5 (\log_3 x)$$

$$5^1 = \log_3 x$$

$$3^5 = x$$

$$243 = x$$