

HW - 4/22/14

Prop. of Logs - LIS #2

$$1. \log_a x^2 + 2 \log_a x$$
$$\log_a x^2 + \log_a x^2$$
$$\log_a x^4$$

$$2. \log_a m^4 - 12 \log_a \sqrt[4]{m}$$
$$\log_a m^4 - \log_a m^3$$
$$\log_a m$$

$$3. \log_2 40 - \log_2 5$$
$$\log_2 8 = 3$$

$$4. 8 \log_2 5$$
$$(2^3)^{\log_2 5}$$
$$2^{\log_2 5^3}$$
$$5^3 = 125$$

$$5. 7^{\log_7 10 + \log_7 5}$$
$$7^{\log_7 10} \cdot 7^{\log_7 5}$$
$$10 \cdot 5 = 50$$

$$6. \log_8 5 + 2 \log_8 3$$
$$\log_8 5 + \log_8 9$$
$$\log_8 45$$

$$7. \frac{1}{2} \log_6 100 - \log_6 2$$
$$\log_6 10 - \log_6 2$$
$$\log_6 5$$

$$8. 8^{3 \log_8 3}$$
$$8^{\log_8 2^7}$$
$$2^7$$

$$9. 2[\ln x - \ln(x+1) - \ln(x-1)]$$
$$2 \ln \frac{x}{(x+1)(x-1)}$$
$$\ln \frac{x^2}{(x+1)^2(x-1)^2}$$

$$10. \frac{1}{2}[\ln(x+1) + 2 \ln(x-1)] + 3 \ln x$$
$$\frac{1}{2}[\ln(x+1)(x-1)^2] + \ln x^3$$
$$\ln(x+1)^{\frac{1}{2}}(x-1)(x^3)$$

$$11. \log_d xyz$$
$$\log_d x + \log_d y + \log_d z$$

$$12. \log_c \frac{x\sqrt{y}}{z^2} = \log_c \left(\frac{xy^{\frac{1}{2}}}{z^2} \right)$$
$$\log_c x + \log_c y^{\frac{1}{2}} - 2 \log_c z$$
$$\log_c x + \frac{1}{2} \log_c y - 2 \log_c z$$

$$13. \ln \sqrt{x^2(x+2)}$$
$$= \ln(x^2(x+2))^{\frac{1}{2}}$$
$$= \frac{1}{2} \ln(x^2(x+2))$$
$$= \frac{1}{2}[\ln x^2 + \ln(x+2)]$$
$$= \frac{1}{2}[2 \ln x + \ln(x+2)] = \ln x + \frac{1}{2} \ln(x+2)$$

$$14. \frac{\ln x}{\sqrt{x^2+1}}$$

$$\ln x - \ln \sqrt{x^2+1}$$

$$\ln x - \frac{1}{2} \ln(x^2+1)$$

$$15. \log_x \sqrt{20}$$

$$\frac{1}{2} \log_x 20$$

$$\frac{1}{2} [\log_x 2 + \log_x 2 + \log_x 5]$$

$$\frac{1}{2} [0.4 + 0.4 + 0.7]$$

$$0.75$$

$$16. \log_x \frac{4}{5}$$

$$\log_x 2 + \log_x 2 - \log_x 5$$

$$0.4 + 0.4 - 0.7$$

$$0.1$$

$$17. \log_b 12$$

$$2 \log_b 2 + \log_b 3$$

$$2a + c$$

$$18. \log_b \frac{2}{9}$$

$$\log_b 2 - 2 \log_b 3$$

$$a - 2c$$

$$19. \log_5 x$$

a. $\frac{\log x}{\log 5}$

b. $\frac{\ln x}{\ln 5}$

$$20. \log_a \frac{3}{4}$$

$$\frac{\log 3 - \log 4}{\log a}$$

$$\frac{\ln 3 - \ln 4}{\ln a}$$

$$21. \log_3 7$$

$$\frac{\log 7}{\log 3} = 1.771$$

$$22. \log_{\frac{1}{8}} 64$$

$$\frac{\log 64}{\log \frac{1}{8}} = -2$$

$$25. x = 5^{y-2} + 4$$

$$x - 4 = 5^{y-2}$$

$$\log_5 (x-4) = y-2$$

$$y = \log_5 (x-4) + 2$$

$$26. x = \log_3 (y-4)$$

$$3^x = y-4$$

$$y = 3^x + 4$$

$$27. x = -2 \left(\frac{1}{2}\right)^{y+1} - 6$$

$$x+6 = -2 \left(\frac{1}{2}\right)^{y+1}$$

$$-\frac{1}{2}(x+6) = \left(\frac{1}{2}\right)^{y+1}$$

$$\log_{\frac{1}{2}} \left(-\frac{1}{2}(x+6)\right) = y+1$$

$$y = \log_{\frac{1}{2}} \left(-\frac{1}{2}(x+6)\right) - 1$$