

WARM UP

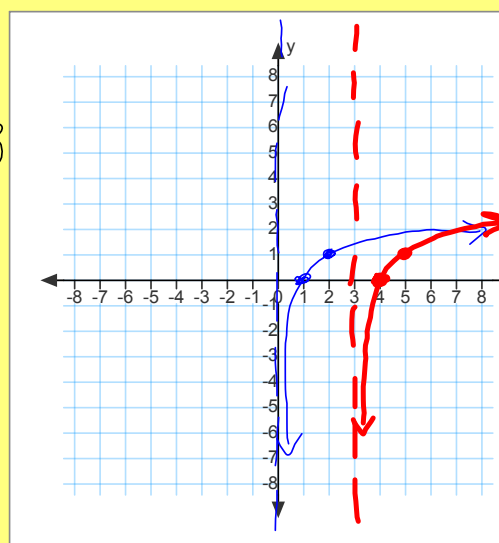
1) Write as a single log: $\log 5 - k \log 3$

$$\log 5 - \log 3^k = \log \frac{5}{3^k}$$

2) Expand the log: $\log_5 2m^4n^{-3}$

$$\log_5 2 + \log_5 m^4 + \log_5 n^{-3}$$

$$\log_5 2 + 4\log_5 m - 3\log_5 n$$



3) Graph: $y = \log_2(x - 3)$

$(1, 0)$ $(4, 1)$ $(7, 2)$

4) Find the % of decrease: $y = 52.80(0.67)^x$

$$ab^x$$

$$b = 1 + r$$

$$.67 = 1 + r$$

$$\frac{-1 \quad -1}{-1 - 1} = r$$

$$-0.33 = r$$

33%

$$\textcircled{27} \log \sqrt{\frac{2x}{y}}$$

$$\log \left(\frac{2x}{y} \right)^{1/2}$$

$$\frac{1}{2} \left(\log \frac{2x}{y} \right)$$

$$\frac{1}{2} (\log 2x - \log y)$$

$$\frac{1}{2} (\log 2 + \log x - \log y)$$

$$\textcircled{20} \log_7 \boxed{22xyz}$$

$$\log_7 22 + \log_7 x + \log_7 y + \log_7 z$$

$$\textcircled{18} \log_7 x + \log_7 y - \log_7 z$$

$$\log_7 xy - \log_7 z$$

$$\log_7 \frac{xy}{z}$$

ANSWERS TO HW 8.4 p. 457 #11- 30 all

11. $\log 14$ 12. $\log_2 3$ 13. $\log 972$ 14. $\log \frac{2}{3}$
15. $\log \frac{m^4}{n}$ 16. $\log \frac{5}{2^k}$ 17. $\log_6 5x$ 18. $\log_7 \frac{xy}{z}$
19. $3 \log x + 5 \log y$
20. $\log_7 22 + \log_7 x + \log_7 y + \log_7 z$
21. $\log_4 5 + \frac{1}{2} \log_4 x$ 22. $\log 3 + 4 \log m - 2 \log n$
23. $\log_5 r - \log_5 s$ 24. $2 \log_3 2 + 2 \log_3 x$
25. $\log_3 7 + 2 \log (2x - 3)$ 26. $2 \log a + 3 \log b - 4 \log c$
27. $\frac{1}{2} \log 2 + \frac{1}{2} \log x - \frac{1}{2} \log y$ 28. $1 + \frac{1}{2} \log_8 3 + \frac{5}{2} \log_8 a$
29. $\log s + \frac{1}{2} \log 7 - 2 \log t$ 30. $-\log_b x$

Example p. 457

State the property or properties used to rewrite each expression.

Example 1
(page 455)

1. $\log 4 + \log 5 = \log 20$

2. $\log_3 32 - \log_3 8 = \log_3 4$

3. $\log z^2 = 2 \log z$

4. $\log_6 \sqrt[n]{x^p} = \frac{p}{n} \log_6 x$

5. $8 \log 2 - 2 \log 8 = \log 4$

6. $\log \sqrt[3]{3x} = \frac{1}{3} \log 3x$

7. $3 \log_4 5 - 3 \log_4 3 = \log_4 \left(\frac{5}{3}\right)^3$

8. $2 \log w + 4 \log z = \log w^2 z^4$

9. $2 \log_2 m - 4 \log_2 n = \log_2 \frac{m^2}{n^4}$

10. $\log_b \frac{1}{8} + 3 \log_b 4 = \log_b 8$

Example 2
(page 455)

Write each logarithmic expression as a single logarithm.

11. $\log 7 + \log 2$

12. $\log_2 9 - \log_2 3$

13. $5 \log 3 + \log 4$

14. $\log 8 - 2 \log 6 + \log 3$

15. $4 \log m - \log n$

16. $\log 5 - k \log 2$

17. $\log_6 5 + \log_6 x$

18. $\log_7 x + \log_7 y - \log_7 z$

Example 3
(page 455)

Expand each logarithm.

19. $\log x^3 y^5$

20. $\log_7 22xyz$

21. $\log_4 5\sqrt{x}$

22. $\log 3m^4 n^{-2}$

23. $\log_5 \frac{t}{s}$

24. $\log_3 (2x)^2$

25. $\log_3 7(2x - 3)^2$

26. $\log \frac{a^2 b^3}{c^4}$

27. $\log \sqrt{\frac{2x}{y}}$

28. $\log_8 8\sqrt{3a^5}$

29. $\log \frac{s\sqrt{7}}{t^2}$

30. $\log_b \frac{1}{x}$

8.4 Part 2 Evaluate:

1) $\log_2 4 + \log_2 8$

$$\log_2 4 = x$$

$$\downarrow$$
$$2^x = 4$$

$$x = 2$$

$$\log_2 8 = x$$

$$\downarrow$$
$$2^x = 8$$

$$x = 3$$

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

2) $\log_6 2 + \log_6 18$

$$\log_6 2 \cdot 18$$

$$\log_6 36$$

$$\downarrow$$
$$6^x = 36$$

$$\boxed{x = 2}$$

Evaluate:

$$3) \quad \frac{1}{2}(\log_5 1) - 3(\log_5 5)$$

$$\log_5 1 \quad \log_5 5$$

$$5^x = 1 \quad 5^x = 5$$

$$x = 0 \quad x = 1$$

$$\frac{1}{2}(0) - 3(1)$$

$$= -3$$

$$4) \quad 2\log_8 4 - \frac{1}{3}\log_8 8$$

$$\log_8 4^2 - \log_8 8^{1/3}$$

$$\log_8 16 - \log_8 2$$

$$\log_8 \frac{16}{2} = \log_8 8 = 1$$

$$8^x = 8$$

$$8^{1/3} = \sqrt[3]{8}$$

8.4 Part 2 HW-

p. 457

33-41 all # 73-76 all # 79 - 84 all

$$\textcircled{82} \quad \log_b \frac{\sqrt{X} \sqrt[3]{y^2}}{\sqrt[5]{z^2}}$$

$$\log_b \sqrt{X} \sqrt[3]{y^2} - \log_b \sqrt[5]{z^2}$$

$$\log X^{1/2} + \log_b y^{2/3} - \log_b z^{2/5}$$

$$\frac{1}{2} \log_b X + \frac{2}{3} \log_b y - \frac{2}{5} \log_b z$$

