ANSWERS 5.5

1. $\log_8 33$
2. $\log_2 90$
3. $\log_a(xyz)$
4. $\log_b\left(x^2+2x-3\right)$
5. $\log_4 2$
6. $\log_5 10$
7. $\log_v\left(\frac{h+1}{h-1}\right)$
8. $\log_6 64$
9. $\log_7 121$
10. $\log_3 \sqrt[3]{25}$
11. $\log_6 \frac{1}{4}$
12. $\log_8 243$
13. $\log q^p$
14. $\log_2 w^{a+8}$
15. $\log 4$
16. $\log 2$
17. $\log 2$
18. $\log_3 108$
19. $\log_7 \frac{1}{4}$
20. $\log\left(\frac{xy}{z}\right)$
21. $\log\left(\frac{x}{yz}\right)$
22. $\log\left(\frac{1}{xyz}\right)$
23. $\log_{11}\left(x^2y^3z^4\right)$
24. $\log_3\left(x^{\frac{1}{2}}y^{\frac{2}{3}}\right)$
25. $\log_k(x-y)$
26. $\log\left(\frac{c^4}{a^2b^3}\right)$
27. $\log\left(\frac{1}{a-1}\right)$
28. 4
29. 3
30. 2
31. 3
32. 20
33. −39
34. $\frac{4}{3}$
35. 2
36. 2
37. 0
38. 4
39. 5
40. 3
41. 5
42. $\frac{3}{2}$
43. $\log_5 4-\log_5 7$
44. $\log_3 8+\log_3 a$
45. $\log_2 9+\log_2 x+\log_2 y$
46. $\log_6 5+\log_6 h-\log_6 3-\log_6 t$
47. $3\log_7 t$
48. $\log_8 4+6\log_8 s+7\log_8 h$
49. $\log_w 12+3\log_w a-2\log_w b$
50. $\log_3 6+\frac{1}{2}\log_3 3-\log_3 11$
51. $\log_a(x-4)+\log_a(x+3)$
52. $-3\log_t a-2\log_t b$
53. $2\log_4(x+5)$
54. $\log_s(m-6)+\log_s(m+3)-\log_s(m+7)-\log_s(m-2)$
55. 1.38685
56. 2.66096
57. 0.52068
58. −2.44566
59. −28.43316
60. −0.73912
61. 1.31396
62. −1.23599
63. (a)
$\log(12+4)=1.204119983$
$\log 12+\log 4=1.681241237$
63. (b)
$\log\left(\frac{12}{4}\right)=0.4771212547$
$\frac{\log 12}{\log 4}=1.79248125$
63. (c)
$\log\left(12^2\right)=2.1585362492$
$(\log 12)^2=1.164632162$
64. There are several possibilities. One suggestion is to write $\log 11$ as $\log\left(\frac{22}{2}\right)$. Then you can use your log properties to obtain $\log\left(\frac{22}{2}\right)=\log 22-\log 2$.
65. to be discussed
66. (a)
$\log_a b=\frac{\log_b b}{\log_b a}=\frac{1}{\log_b a}$
66. (b)
$(\log_c b)(\log_a c)$
$=\left(\frac{\log_a b}{\log_a c}\right)(\log_a c)$
$=\log_a c$
67.
$\log_b b^x=x\log_b b=x(1)=x$
68. 0
69.
(a) $r+s$
(b) $4s$
(c) $s-r$
(d)
$\log 30=\log(3\cdot 10)$
$=\log 3+\log 10=s+1$
(e) $2r+2s$
(f) $-5r$
(g) $1-r$