Solving logs assignment

1. $\log_3(3x-11) = \log_3(25-x)$

$3x-11 = 25-x$

$4x = 36$

$x = 9$

3. $\log_2 75 = \log_2 3 + \log_2(2y-1)$.

$\log_2 75 = \log_2 3(2y-1)$.

$75 = 6y - 3$

$78 = 6y \Rightarrow y = 13$

2. $\log_7(4n-7) = \log_7(-3n)$

$4n-7 = -3n$

$7n = 7 \Rightarrow n = 1$

4. $2\log m = \log 36$

$\log m^2 = \log 36$

$m^2 = 36$

$m = \pm\sqrt{36} = \pm 6$

5. $\log_4 108 - \log_4 9 = \log_4(7a-9)$

$\log_4\left(\frac{108}{9}\right) = \log_4(7a-9)$

$12 = 7a-9$

$21 = 7a \Rightarrow a = 3$

6. $\frac{1}{3}\log_5 64 = \log_5 8 + \log_5 p$

$\log_5 64^{\frac{1}{3}} = \log_5(8p)$

$\log_5 4 = \log_5 8p \quad 8p = 4 \quad p = 1/2$

7. $\log(w^2+21) = \log(10w)$

$w^2+21 = 10w$

$w^2 - 10w + 21 = 0$

$(w-3)(w-7) = 0 \Rightarrow w=3, w=7$

8. $\log_2(2x) + \log_2(x-7) = \log_2 4x$

$\log_2(2x)(x-7) = \log_2 4x$

$2x^2 - 14x = 4x$

$2x^2 - 18x = 0$

$2x(x-9) = 0 \quad x=9 \text{ or } x=0$

9. $\log_4(2m^3-14m^2) - \log_4 2m = \log_4 8$

$\log_4 \left[\frac{2m^3-14m^2}{2m}\right] = \log_4 8$

$\log_4 m^2-7m = \log_4 8$

$m^2-7m-8 = 0$

$(m+1)(m-8) = 0 \Rightarrow m=-1 \text{ or } m=8$

10. $2\log(x-3) = \log 25$

$\log(x-3)^2 = \log 25$

$x^2-6x+9 = 25$

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

$(x+2)(x-8) = 0 \Rightarrow x=-2 \text{ or } x=8$

11. $\log_3(2x-7) = 4$

$\log_3 2x-7 = 4\log_3 3$

$2x-7 = 3^4 = 81$

$2x = 88 \quad x = 44.$

12. $\log_8(28k-20)+15 = 18$

$\log_8(28k-20) = 3\log_8 8$

$\log_8 28k-20 = \log_8 512$.

$28k-20 = 512$.

$28k = 532 \Rightarrow k = 19$

13. $\log_9(15-4n) = \frac{1}{2}\log_9 9$

$\log_9(15-4n) = \log_9 3$

$15-4n = 3$

$12 = 4n \quad n = 3$.

14. $\log_2 4 + \log_2(c-9) = 5$

$\log_2 4 + \log_2(c-9) = 5\log_2 2$

$\log_2 \frac{4(c-9)}{4} = \log_2 2^5$

$4c-36 = 32$.

$4c = 68$

$c = 17$.

15. $2\log_4 k = 4$

$\log_4 k^2 = 4\log_4 4 \Rightarrow \log_4 k^2 = \log_4 4^4$

$k^2 = 256 \Rightarrow k = \pm\sqrt{256} \Rightarrow \pm 16$

16. $\log_8(p^2+15) = 2\log_8 8$

$p^2+15 = 8^2$

$p^2+15 = 64 \quad p2 = 49$

$p = \pm\sqrt{49} = \pm 7$