**Condense**

16. $\log 5 + \log x - \log y$

$\log \frac{5x}{y}$

17. $\ln 5 + \frac{1}{2}\ln x + 2\ln z$

$\ln 5\sqrt{x}z^2$ or $\ln 5z^2\sqrt{x}$

18. $3\log_5 3 + 2\log_5 a - \log_5 b - 2\log_5 c$

$\log_5 \frac{27a^2}{bc^2}$

19. $3\log_3 x - \log_3 7 - 4\log_3 y$

$\log_3 \frac{x^3}{7y^4}$

20. $\log_3 a - 2\log_3 b - 3\log_3 c$

$\log_3 \frac{a}{b^2c^3}$

21. $\log x + 2\log y + 3\log z - \log 5$

$\log \frac{xy^2z^3}{5}$

**Convert Log to Exponential:**

22. $\log_3(x-2) = 4$

$3^4 = x-2$

23. $\log_x \frac{1}{81} = -4$

$x^{-4} = \frac{1}{81}$

24. $\log a = z$

$10^z = a$

**Convert Exponential to Log:**

25. $x^{-3} = \frac{1}{64}$

$\log_x \frac{1}{64} = -3$

26. $9^x = w$

$\log_9 w = x$

27. $b^t = k$

$\log_b k = t$

**Solve:**

28. $4(3^{x-2}) - 11 = 313$

$4(3^{x-2}) = 324$

$3^{x-2} = 81$

$3^{x-2} = 3^4$

$x-2 = 4$

$x = 6$

29. $5^{x-18} = \left(\frac{1}{625}\right)^{2x}$

$5^{x-18} = (5^{-4})^{2x}$

$x - 18 = -8x$

$9x = 18$

$x = 2$

30. $3\log_4(x+3) + 16 = 22$

$3\log_4(x+3) = 6$

$\log_4(x+3) = 2$

$4^2 = x+3$

$16 = x+3$

$x = 13$