Name: _____ Date: _____

Solve the following exponential functions [be sure to check your answers!]:

1. $e^x = 45$

2. $5^x - 21 = 14$

3. $81^{x+1} = 3^{5x+6}$

4. $3e^{2x} - 4 = 44$

5. $3\left(4^{x-4}\right) - 8 = 106$

6. $\left(\frac{1}{27}\right)^{x+1} = 3^{6x+6}$

7. $81^{x+1} = 243$

8. $2\ 3^{\ 2x} - 5 = 117$

9. $-4e^x + 21 = -39$

10. $4^{3x+9} = \left(\frac{1}{64}\right)^x$

Solve the following logarithmic functions [be sure to check your answers!]:

11. $\log_2(4x) = 5$

12. $\log_6(5x + 11) + 5 = 8$

13. $\log_5(3x - 7) = \log_5(7x - 21)$

14. $\log_3(x) + \log_3(x - 6) = 3$

15. $\log_4(192) - \log_4(3x) = 2$

16. $\log_3(x^2 + 3x) = \log_3(x + 15)$

17. $\log_2(4x) - \log_2(x - 2) = 3$

18. $\log_4(x - 15) - \log_4(x) = 2$

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

20. $\log_3(x) + \log_3(x - 1) = \log_3(3x + 12)$