F.S.T. **Name _____**

Homework 6-6 **Block _____ Date _____**

Solve each equation. Round to the hundredths.

1. $e^x = 18$

2. $10^x = 350$

3. $e^{2x} = 42$

4. $10^x - 2 = 29$

5. $e^x + 3 = 5$

6. $2 \bullet 10^x = 150$

7. $3e^x + 1 = 85$

8. $10^{2x} - 9 = 38$

9. $\frac{1}{2}e^{3x} + 6 = 7$

10. $3^x = 15$

11. $2^x - 1 = 104$

12. $4^{3x} = 1500$

Solve the exponential equation. Round to the hundredths.

13. $\ln x = 5$

14. $\log_{10} x = -2$

15. $\log_2 x = 1.5$

16. $7 + \log_{10} x = 4$

17. $7 \ln x = 21$

18. $-3 + 2 \ln x = 5$

19. $3 \log_{10} x = 12$

20. $9 \log_2 x = 15$

21. $\log_3 3x = 2$

22. $4\log_7(3w+1)=14$

23. $\log_5(a+3)-\log_5(a-1)=1$

24. $\log_2(y+1)=3+\log_2(y-6)$

25. **Compound Interest:** You deposit $2000 in an account that pays 6% annual interest, compounded quarterly. How long will it take for the balance to reach $2500?

26. **Compound Interest:** You deposit $2000 in an account that pays 6% annual interest, compounded continuously. How long will it take for the balance to reach $2500?

27. **Rocket Velocity:** Disregarding the force of gravity, the maximum velocity, *v*, of a rocket is given by $v=t \ln M$ where *t* is the velocity of the exhaust and *M* is the ratio of the mass of the rocket with fuel to its mass without fuel. A solid propellant rocket has an exhaust velocity of 2.5 kilometers per second. Its maximum velocity is 7.5 kilometers per second. Find its mass ratio, *M*.

28. A mortgage is a kind of loan that is usually repaid in equal monthly installments. The following formula gives the monthly payment, *M*, in terms of the amount of the loan, *P*, the number of months, *n*, before the loan is fully repaid, and the monthly interst rate, *r*:

$$M=\frac{rP}{1-(1+r)^{-n}}$$

a. Ariella borrows $150,000 at 8.5% annual interest for 25 years. Calculate her monthly payment.

b. Suppose Ariella would like to have $1150 as a monthly payment. With the same interest rate as in part a, how many months until the loan would be repaid?