HW #31: SHOW ALL WORK on a separate piece of paper. A calculator may be used on the problems.

Graph each equation. State the domain, range, intercepts, asymptote, and end behavior.

1. $f(x) = -e^{x+6} - 2$
2. $y = -\frac{1}{2}\log_3 x - 5$

3. $f(x) = \frac{2}{3} e^{-(x-2)} - 4$
4. $y = -2\ln(x + 2) + 4$

Solve each equation and check for extraneous solutions

5. $12 - 8^{x+1} = 3$
6. $\ln(x + 3) + \ln(x - 6) = 2$
7. $5e^{3x} + 10 = 18$

8. $\left(\frac{1}{2}\right)^{3x} - 8 = 12$
9. $\frac{1}{3}(4)^{-5x} + 2 = 5$
10. $\log_{25}(\log_4 x) = \frac{1}{2}$

11. $\log_4(x - 2) + \log_4(x - 5) = 2$
12. $\log_2 -x + \log_2(x + 12) = 5$

Simplify each expression

13. $\sqrt[3]{40e^{6x}y^9z^5}$
14. $\frac{14\,e^{6x}}{18e^{10x}}$
15. $(4e^{-3x})^{-2}$
16. $\sqrt{\frac{4\,(35e^{10}x)}{5e^7x^{-5}}}$

17. You deposit $4500 in an account that pays 8% annual interest compounded monthly.
    a) What is your account balance after 10 years?
    b) In how many years will your account balance reach $30,000?

18. How much must be deposited in an account that pays 7.5% annual interest, compounded continuously, to have a balance of $14,000 after 6 years?

19. How much must you deposit in an account paying 6% annual interest compounded daily in order to have a balance of $5,000 after 3 years?

20. You deposit $3600 in an account that pays 5.75% annual interest compounded continuously.
    a) What is your account balance after 5 years?
    b) In how many years will your balance reach $12,000?

21. In 1998, the population of Mission Viejo, Ca was 65,000. During the next ten years the population increased by 4% each year.
    a) Write a model giving the population of Mission Viejo t years after 1998.
    b) Find the population of Mission Viejo in 2004.
    c) Find the year when the population will be about 100,000.

22. A car depreciates at a rate of 14% per year. If the car price when purchased was $46,000, in how many years will the car be worth only $23,000?

Evaluate each expression using the change of base formula

23. $\log_4 13$
24. $\log_5 20$
25. $\log_2 30$