Solve for $x$:

1) $3^{2x+5} = 3^3$

2) $5^{2x-5} = 125^{2x-11}$

3) $\log x = 3$

4) $\log_5(x^2 + 1) = 1$

5) $\log_x 32 = 5$

6) $\log_4 4^{2x+3} = 9$

7) $\log_{719}(5x - 8) = \log_{719}(2x + 7)$

8) $\log_3 180 - \log_3 6x = \log_3 4$

9) $\log_2 x = \frac{1}{4}\log_2 16 + \frac{1}{2}\log_2 49$

10) $\log_6(x + 2) + \log_6(x - 3) = 1$

11) $7e^x - 3 = 0$

12) $-4e^{5x} + 11 = 3$

13) $2e^{2x-4} = 18$

14) $\ln\sqrt{x} = 4$

15) $\ln(x - 3) = 1$

16) $\ln(x + 4) - 3 = 2$

Answer each question thoroughly.

Formulas: $y = ae^{rt},\ y = ae^{-rt},\ y = a(1+r)^t,\ y = a(1-r)^t,\ y = P\left(a + \frac{r}{n}\right)^{nt}$

17) Mr. Stewart discovers a banking error offering an annual rate of 87%, compounded continuously! He invests $20,000 of the math club budget. How much money will he have after 10 years?

18) In the future, America ceases funding the NASA program, choosing to focus on studying topsoil and how it can form dust clouds. Ms. Shaw reads about a spacecraft capable of interstellar flight for two people and suggests that Mr. Stewart spends $100,000,000 of the math club budget on the craft. He sees the benefits of being able to escape the planet for a while after assigning large sets of homework problems and agrees. They expect the spaceship to depreciate at a rate of $18\%$ per year. What will the value of the spaceship be after 5 years?