Name _____ Date _____

In Exercises 1–9, solve the equation. Check your solution.

1. $3^{8x} = 3^{5x-6}$

2. $4^x = 2^{5x+3}$

3. $8^{5x} = 4^{4x+7}$

4. $25^{x-2} = 125^{3x+1}$

5. $9^{x-6} = 729^{3(x+2)}$

6. $4^{6(-x+2)} = 8^{-3x-4}$

7. $\left(\frac{1}{8}\right)^{2x+4} = 16^{4-x}$

8. $\left(\frac{2}{3}\right)^{x+8} = \left(\frac{3}{2}\right)^{2x-5}$

9. $\left(\frac{5}{4}\right)^{3x+5} = \left(\frac{16}{25}\right)^{-4x}$

10. Describe and correct the error in solving the exponential equation.

$$\cancel{} \quad \left(\frac{1}{16}\right)^{3x} = 64^{x-4}$$
$$\left(4^{-2}\right)^{3x} = \left(8^2\right)^{x-4}$$
$$-6x = 2x - 8$$
$$x = 1$$

In Exercises 11–16, use a graphing calculator to solve the equation.

11. $4^{-x+2} = -\frac{1}{3}x + 5$

12. $\frac{1}{2}x + 3 = \left(\frac{1}{5}\right)^{2x+1}$

13. $6^x = 4^{-x+3}$

14. $5^{x-4} = 3^{-x}$

15. $3^{x+2} = -4^{-x+1}$

16. $3^{-x-5} = 2^{x+3}$

17. A bread dough doubles in size every hour. You begin measuring the volume of the dough 1 hour after the dough is prepared. The volume y (in cubic inches) of the dough x hours after the dough is prepared is represented by $y = 35\left(2^{x-1}\right)$.

When will the volume of the dough be 4200 cubic inches?

In Exercises 18–20, solve the equation.

18. $125^{x-1} = 5^{3x-2}$

19. $8^{2x+1} = 2^{3(2x+1)}$

20. $3^{8(2x-1)} = 81^{4x-2}$

21. You deposit $750 in a savings account that earns 4% annual interest compounded yearly. Write and solve an exponential equation to determine when the balance of the account will be $1000.

In Exercises 22 and 23, use a graphing calculator to solve the equation.

22. $\sqrt{3} = 3^{3x-5}$

23. $\sqrt{2} = 2^{x-3}$