Name: _____ Date: _____

Solving Exponential Functions

Solve each equation:

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

$2x-5=x+3$

$x-5=3$

$\boxed{x=8}$

2. $9^{x-5} = 27$

$3^{2(x-5)} = 3^3$

$2(x-5) = 3$

$2x-10=3$

$2x=13$

$\boxed{x=\frac{13}{2}}$

3. $5^{2x+3} = 625$

4. $81^{x+3} = \left(\frac{1}{3}\right)^{5x-6}$

$81^{x+3} = 3^{-1(5x-6)}$

$3^{4(x+3)} = 3^{-1(5x-6)}$

$4x+12 = -5x+6$

$9x+12=6$

$9x=-6$

$\boxed{x=-2/3}$

5. $\left(\frac{1}{3}\right)^x - 9 = 18$

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

$3^{-1(x)} = 27$

$3^{-1x} = 3^3$

$-1x=3$

$\boxed{x=-3}$

6. $4^x = \left(\frac{1}{2}\right)^{x-3}$

7. $8^x = 1$

8. $4^x + 5 = 21$

9. $16^{2x+4} = \left(\frac{1}{4}\right)^{x-8}$

Write in simplest radical form. (Using only one radical sign in each problem)

10. $64^{1/2}$

11. $8^{-1/2}$

12. $a^{3/5} \cdot a^{1/5}$

$a^{3/5+1/5} = a^{4/5}$

$\sqrt[5]{a^4}$

13. $(4x^2y)^{1/3}$

$\sqrt[3]{4x^2y}$

Write each expression with fractional exponents.

14. $\sqrt{8x^4}$

15. $3a\sqrt[6]{a^4}$

16. $xy^3\sqrt[4]{5xy}$

17. $\sqrt{x^3y^6}$

$x^1y^3 \cdot 5^{1/4} x^{1/4} y^{1/4}$

$5^{1/4} x^{5/4} y^{13/4}$

Simplify. (Radical Form)

18. $2x \cdot y^{4/5}z^{1/5}$

19. $(xy^2)^{1/3}$

20. $(x^{-1/2} \cdot x^{3/4})^{-2}$

21. $\frac{x^{4/5}}{3x^{2/5}} =$

$x^{4/5-2/5} = x^{2/5}$

$\frac{x^{2/5}}{3} = \frac{\sqrt[5]{x^2}}{3}$

22. $(2x^{1/2}y^{3/4})(3x^{1/4}) =$

$6x^{\frac{1}{2}+\frac{1}{4}} y^{\frac{3}{4}} = 6x^{\frac{3}{4}} y^{\frac{3}{4}}$

$= 6\sqrt[4]{x^3y^3}$

23. $2x^{5/7}y^{3/7} =$

24. $6(a^2b^3)^{1/8} =$

25. $(2a^4b^{3/10})^2 =$

26. $(5a^{-1/2}b^{-3/2})^2 =$

28. $\left(\frac{2x^3y^{1/2}}{x^2}\right)^{-1} =$

29. $(4x^3y^5)^{1/6} =$