



Name _____ Date _____ Period _____

SOLVING EXPONENTIAL EQUATIONS WORKSHEET

Exponent Properties:

Rule 1: product of two powers with like bases $b^x \times b^y = b^{(x+y)}$

Rule 2: quotient of two powers with like bases $\frac{b^x}{b^y} = b^{(x-y)}$

Rule 3: power of a power $(b^x)^y = b^{(x \cdot y)}$

Rule 4: power with a negative exponent $b^{-x} = \frac{1}{b^x}$

Rule 5: power with a zero exponent $b^0 = 1$

Rule 6: power of a quotient $\left(\frac{a}{b}\right)^x = \frac{a^x}{b^x}$

One-to-One Property of Exponential Functions

If $b^n = b^m$
then $n = m$

Solve & Check:

1. $4^x = 2$

6. $5^{(2p+1)} = 25$

2. $125^r = 5$

7. $\frac{1}{27} = b^{-3}$

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

8. $\frac{1}{81} = k^{-4}$

4. $\left(\frac{2}{3}\right)^x = \frac{9}{4}$

9. $4 = r^{\frac{2}{3}}$

5. $2^{(3-y)} = 8$

10. $z^{\frac{5}{2}} = 32$

11. $27^{4z} = 9^{z+1}$

18. $\left(\frac{2}{3}\right)^{(k-1)} = \left(\frac{81}{16}\right)^{(k+1)}$

12. $32^t = 16^{1-t}$

19. $4^{|x|} = 64$

13. $125^{-x} = 25^{3x}$

20. $(y-3)^{\frac{2}{3}} = 9$

14. $216^{3-a} = 36^a$

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

15. $\left(\frac{1}{8}\right)^{-2p} = 2^{p+3}$

22. $10^{-5x} = (10^2)^x$

16. $3^{-h} = \left(\frac{1}{27}\right)^{(1-2h)}$

23. $7^{3(1+x)} = 7^{-8x}$

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

24. $\left(\frac{2}{5}\right)^{|3x-2|} = \frac{4}{25}$