Algebra 2
Worksheet 7.5

Name Key
Period ____

Name the five strategies for working with logs and exponents:

1. 2. 3. 4. 5.

Now use these to solve the following problems. Label the strategy used:

5. $2^x = 71$

$x \log 2 = \log 71$

$x = \frac{\log 71}{\log 2}$

$x \approx 6.15$

6. $\left(\frac{1}{16}\right)^x = 2^{x+1}$

$2^{-4x} = 2^{x+1}$

$-4x = x+1$

$-5x = 1$

$x = -\frac{1}{5}$

7. $\log_x 64 = 3$

$x^3 = 64$

$\sqrt[3]{x^3} = \sqrt[3]{64}$

$x = 4$

8. $x^{\frac{3}{4}} = 8$

$(x^{3/4})^{4/3} = 8^{4/3}$

$x = (\sqrt[3]{8})^4$

$x = 16$

9. $\log_5 61.8$

$= \frac{\log 61.8}{\log 5}$

≈ 2.56

10. $9^x = 45$

$x \log 9 = \log 45$

$x = \frac{\log 45}{\log 9}$

$x \approx 1.73$

11. $\log_7 23$

$= \frac{\log 23}{\log 7}$

≈ 1.61

12. $\log_{25} x = \frac{3}{2}$

$25^{3/2} = x$

$(\sqrt{25})^3 = x$

$125 = x$

13. $x^{-\frac{1}{2}} = 6$

$(x^{-1/2})^{-2} = 6^{-2}$

$x = \frac{1}{36}$

14. $9^{x-3} = 27$

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

$2x-6 = 3$

$2x = 9$

$x = 9/2$

15. $\log_4 19$

$= \frac{\log 19}{\log 4}$

≈ 2.12

16. $3^{2x+3} = 1.77$

$\log 3^{2x+3} = \log 1.77$

$(2x+3)\log 3 = \log 1.77$

$2x+3 = \frac{\log 1.77}{\log 3}$

$x = \frac{1}{2}\left(\frac{\log 1.77}{\log 3} - 3\right)$

$x \approx -1.24$

17. $\log_3 \frac{1}{27} = x$

$3^x = \frac{1}{27}$

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

$x = -3$

18. $x^{\frac{2}{3}} = 16$

$(x^{2/3})^{3/2} = 16^{3/2}$

$x = (\sqrt{16})^3$

$x = 64$

19. $4^{x-2} = 64$

$4^{x-2} = 4^3$

$x-2 = 3$

$x = 5$

20. $7x^{\frac{1}{5}} = -21$

$x^{1/5} = -3$

$(x^{1/5})^5 = (-3)^5$

$x = -243$

21. $125^{x-2} = \left(\frac{1}{5}\right)^x$

$(5^3)^{x-2} = (5^{-1})^x$

$3x-6 = -x$

$4x = 6$

$x = \frac{3}{2}$

22. $\log_6 138.2$

$= \frac{\log 138.2}{\log 6}$

≈ 2.75

23. $8.2^x = 164.5$

$x \log 8.2 = \log 164.5$

$x = \frac{\log 164.5}{\log 8.2}$

$x \approx 2.43$

24. $\log_7 x = -2$

$7^{-2} = x$

$\frac{1}{49} = x$