Algebra 2: Unit 1 Lesson 7 Worksheet
Converting and Evaluating Logs

Name: ____ Hour: _________

<u>Convert the following exponential equations to logarithmic equations.</u>

Ex 1: $144 = 12^2$. This would convert to: $\log_{12} 144 = 2$. The base of the log is the base of the exponential. The answer is always an exponent.

Ex 2: $\left(\frac{1}{4}\right)^2 = \left(\frac{1}{16}\right)$. This converts to: $\log_{\frac{1}{4}}\left(\frac{1}{16}\right) = 2$. Everything still goes in the same place as it did in example 1. The base became the base. The exponent is the answer.

Ex 3: $13^{\log_4 7} = x$. This converts to: $\log_{13} x = \log_4 7$. The base of the log is 13, since it's the base of the exponential. Then the answer is always the exponent, which in this case is $\log_4 7$.

1. $y = 3^x$ ______________________

2. $6859 = 19^3$ ______________________

3. $12^2 = 144$ ______________________

4. $\left(\frac{1}{2}\right)^3 = \frac{1}{8}$ ______________________

5. $\left(\frac{3}{7}\right)^3 = \frac{27}{343}$ ______________________

6. $\left(\frac{1}{2}\right)^5 = \frac{1}{32}$ ______________________

7. $\left(\frac{5}{8}\right)^4 = \frac{625}{4096}$ ______________________

8. $\left(\frac{2}{3}\right)^4 = \frac{16}{81}$ ______________________

9. $\left(\frac{7}{12}\right)^3 = y$ ______________________

10. $\left(\frac{4}{5}\right)^2 = \frac{16}{25}$ ______________________

11. $e^x = y$ ______________________

12. $e^{\frac{1}{2}} = x$ ______________________

13. $61^x = y$ ______________________

14. $22^{43} = y$ ______________________

15. $11^{\log_{11} 5} = x$ ______________________

16. $y = 9^{\log_9 x}$ ______________________

17. $64 = 4^x$ ______________________

18. $343 = 7^3$ ______________________

19. $71^x = 14.5$ ______________________

20. $9^{\log_2 8} = x$ ______________________

<u>(There is a back side to this)</u>

Convert the following Logarithmic Equations to Exponential Equations.

To do this, remember the circle trick we learned. The base of the log turns into the base of the exponential. The answer to the logarithmic equation is an exponent.

Ex 1: $\log_{105} 11025 = 2$ … Converts to $105^2 = 11025$

Ex 2: $\log_8 4096 = 4$ … Converts to $8^4 = 4096$

21. $\log_2 32 = 5$ ______________________

22. $\log_5 1 = 0$ ______________________

23. $\log_{10} 10 = 1$ ______________________

24. $\log_{10} 0.1 = -1$ ______________________

25. $\log_{\frac{1}{2}} 2 = -1$ ______________________

26. $\log_3 81 = 4$ ______________________

27. $\log_5 0.04 = -2$ ______________________

28. $\log_{\frac{1}{2}} 8 = -3$ ______________________

29. $\log_9 3 = 2$ ______________________

30. $\log_4 1024 = 5$ ______________________

31. $\log_5 \left(\frac{1}{5}\right) = -1$ ______________________

32. $\log_{36} \left(\frac{1}{6}\right) = -\frac{1}{2}$ ______________________

33. $\log_8 512 = 3$ ______________________

34. $\log_{14} 196 = 2$ ______________________

Evaluating Log Expressions.

To evaluate log expressions, you have to think about the expression as an exponential expression.

Ex 1: $\log_2 8 = 3$ This converts to $2^x = 8$. This equals 3. Since 2 raised to the 3rd power gives you 8.

35. $\log_5 125 =$ _____

36. $\log_7 343 =$ _____

37. $\log_8 1 =$ _____

38. $\log_{12} 12 =$ _____

39. $\log_6 36 =$ _____

40. $\log_4 16 =$ _____

41. $\log_9 729 =$ _____

42. $\log_7 2401 =$ _____

43. $\log_{\frac{1}{4}} \frac{1}{4} =$ ________

44. $\log_6 1 =$ ________

45. $\log 100 =$ _______

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34. $\log_{14} 196 = 2$ ______________________

Evaluating Log Expressions.

To evaluate log expressions, you have to think about the expression as an exponential expression.

Ex 1: $\log_2 8 = 3$ This converts to $2^x = 8$. This equals 3. Since 2 raised to the 3rd power gives you 8.

35. $\log_5 125 =$ _____
36. $\log_7 343 =$ _____
37. $\log_8 1 =$ _____
38. $\log_{12} 12 =$ _____
39. $\log_6 36 =$ _____
40. $\log_4 16 =$ _____
41. $\log_9 729 =$ _____
42. $\log_7 2401 =$ _____
43. $\log_{\frac{1}{4}} \frac{1}{4} =$ ________
44. $\log_6 1 =$ ________
45. $\log 100 =$ _______
46. $\log_e 1 =$ ________

Algebra 2: Unit 1 Lesson 7 Worksheet
Converting and Evaluating Logs

Name: ____ Hour: _________

Convert the following exponential equations to logarithmic equations.

Ex 1: $144 = 12^2$. This would convert to: $\log_{12} 144 = 2$. The base of the log is the base of the exponential. The answer is always an exponent.

Ex 2: $\left(\frac{1}{4}\right)^2 = \left(\frac{1}{16}\right)$. This converts to: $\log_{\frac{1}{4}}\left(\frac{1}{16}\right) = 2$. Everything still goes in the same place as it did in example 1. The base became the base. The exponent is the answer.

Ex 3: $13^{\log_4 7} = x$. This converts to: $\log_{13} x = \log_4 7$. The base of the log is 13, since it's the base of the exponential. Then the answer is always the exponent, which in this case is $\log_4 7$.

1. $y = 3^x$ ______________________

2. $6859 = 19^3$ ______________________

3. $12^2 = 144$ ______________________

4. $\left(\frac{1}{2}\right)^3 = \frac{1}{8}$ ______________________

5. $\left(\frac{3}{7}\right)^3 = \frac{27}{343}$ ______________________

6. $\left(\frac{1}{2}\right)^5 = \frac{1}{32}$ ______________________

7. $\left(\frac{5}{8}\right)^4 = \frac{625}{4096}$ ______________________

8. $\left(\frac{2}{3}\right)^4 = \frac{16}{81}$ ______________________

9. $\left(\frac{7}{12}\right)^3 = y$ ______________________

10. $\left(\frac{4}{5}\right)^2 = \frac{16}{25}$ ______________________

11. $e^x = y$ ______________________

12. $e^{\frac{1}{2}} = x$ ______________________

13. $61^x = y$ ______________________

14. $22^{43} = y$ ______________________

15. $11^{\log_{11} 5} = x$ ______________________

16. $y = 9^{\log_9 x}$ ______________________

17. $64 = 4^x$ ______________________

18. $343 = 7^3$ ______________________

19. $71^x = 14.5$ ______________________

20. $9^{\log_2 8} = x$ ______________________

(There is a back side to this)

Convert the following Logarithmic Equations to Exponential Equations.

To do this, remember the circle trick we learned. The base of the log turns into the base of the exponential. The answer to the logarithmic equation is an exponent.

Ex 1: $\log_{105} 11025 = 2$ … Converts to $105^2 = 11025$

Ex 2: $\log_8 4096 = 4$ … Converts to $8^4 = 4096$

21. $\log_2 32 = 5$ ____________________
22. $\log_5 1 = 0$ ____________________
23. $\log_{10} 10 = 1$ ____________________
24. $\log_{10} 0.1 = -1$ ____________________
25. $\log_{\frac{1}{2}} 2 = -1$ ____________________
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28. $\log_{\frac{1}{2}} 8 = -3$ ____________________
29. $\log_9 3 = 2$ ____________________
30. $\log_4 1024 = 5$ ____________________
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Algebra 2: Unit 1 Lesson 7 Worksheet
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Algebra 2: Unit 1 Lesson 7 Worksheet
Converting and Evaluating Logs

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Algebra 2: Unit 1 Lesson 7 Worksheet
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18. $343 = 7^3$ ______________________
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20. $9^{\log_2 8} = x$ ______________________

(There is a back side to this)

Convert the following Logarithmic Equations to Exponential Equations.

To do this, remember the circle trick we learned. The base of the log turns into the base of the exponential. The answer to the logarithmic equation is an exponent.

Ex 1: $\log_{105} 11025 = 2$ … Converts to $105^2 = 11025$

Ex 2: $\log_8 4096 = 4$ … Converts to $8^4 = 4096$

21. $\log_2 32 = 5$ ______________________
22. $\log_5 1 = 0$ ______________________
23. $\log_{10} 10 = 1$ ______________________
24. $\log_{10} 0.1 = -1$ ______________________
25. $\log_{\frac{1}{2}} 2 = -1$ ______________________
26. $\log_3 81 = 4$ ______________________
27. $\log_5 0.04 = -2$ ______________________
28. $\log_{\frac{1}{2}} 8 = -3$ ______________________
29. $\log_9 3 = 2$ ______________________
30. $\log_4 1024 = 5$ ______________________
31. $\log_5 \left(\frac{1}{5}\right) = -1$ ______________________
32. $\log_{36} \left(\frac{1}{6}\right) = -\frac{1}{2}$ ______________________
33. $\log_8 512 = 3$ ______________________
34. $\log_{14} 196 = 2$ ______________________

Evaluating Log Expressions.

To evaluate log expressions, you have to think about the expression as an exponential expression.

Ex 1: $\log_2 8 = 3$ This converts to $2^x = 8$. This equals 3. Since 2 raised to the 3rd power gives you 8.

35. $\log_5 125 =$ _____
36. $\log_7 343 =$ _____
37. $\log_8 1 =$ _____
38. $\log_{12} 12 =$ _____
39. $\log_6 36 =$ _____
40. $\log_4 16 =$ _____
41. $\log_9 729 =$ _____
42. $\log_7 2401 =$ _____
43. $\log_{\frac{1}{4}} \frac{1}{4} =$ ________
44. $\log_6 1 =$ ________
45. $\log 100 =$ _______
46. $\log_e 1 =$ ________

Algebra 2: Unit 1 Lesson 7 Worksheet
Converting and Evaluating Logs

Name: ____ Hour: _________

Convert the following exponential equations to logarithmic equations.

Ex 1: $144 = 12^2$. This would convert to: $\log_{12} 144 = 2$. The base of the log is the base of the exponential. The answer is always an exponent.

Ex 2: $\left(\frac{1}{4}\right)^2 = \left(\frac{1}{16}\right)$. This converts to: $\log_{\frac{1}{4}}\left(\frac{1}{16}\right) = 2$. Everything still goes in the same place as it did in example 1. The base became the base. The exponent is the answer.

Ex 3: $13^{\log_4 7} = x$. This converts to: $\log_{13} x = \log_4 7$. The base of the log is 13, since it's the base of the exponential. Then the answer is always the exponent, which in this case is $\log_4 7$.

1. $y = 3^x$ ______________________
2. $6859 = 19^3$ ______________________
3. $12^2 = 144$ ______________________
4. $\left(\frac{1}{2}\right)^3 = \frac{1}{8}$ ______________________
5. $\left(\frac{3}{7}\right)^3 = \frac{27}{343}$ ______________________
6. $\left(\frac{1}{2}\right)^5 = \frac{1}{32}$ ______________________
7. $\left(\frac{5}{8}\right)^4 = \frac{625}{4096}$ ______________________
8. $\left(\frac{2}{3}\right)^4 = \frac{16}{81}$ ______________________
9. $\left(\frac{7}{12}\right)^3 = y$ ______________________
10. $\left(\frac{4}{5}\right)^2 = \frac{16}{25}$ ______________________
11. $e^x = y$ ______________________
12. $e^{\frac{1}{2}} = x$ ______________________
13. $61^x = y$ ______________________
14. $22^{43} = y$ ______________________
15. $11^{\log_{11} 5} = x$ ______________________
16. $y = 9^{\log_9 x}$ ______________________
17. $64 = 4^x$ ______________________
18. $343 = 7^3$ ______________________
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Convert the following Logarithmic Equations to Exponential Equations.

To do this, remember the circle trick we learned. The base of the log turns into the base of the exponential. The answer to the logarithmic equation is an exponent.

Ex 1: $\log_{105} 11025 = 2$ … Converts to $105^2 = 11025$

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Algebra 2: Unit 1 Lesson 7 Worksheet
Converting and Evaluating Logs

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Algebra 2: Unit 1 Lesson 7 Worksheet
Converting and Evaluating Logs

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Algebra 2: Unit 1 Lesson 7 Worksheet
Converting and Evaluating Logs

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1. $y = 3^x$ ______________________
2. $6859 = 19^3$ ______________________
3. $12^2 = 144$ ______________________
4. $\left(\frac{1}{2}\right)^3 = \frac{1}{8}$ ______________________
5. $\left(\frac{3}{7}\right)^3 = \frac{27}{343}$ ______________________
6. $\left(\frac{1}{2}\right)^5 = \frac{1}{32}$ ______________________
7. $\left(\frac{5}{8}\right)^4 = \frac{625}{4096}$ ______________________
8. $\left(\frac{2}{3}\right)^4 = \frac{16}{81}$ ______________________
9. $\left(\frac{7}{12}\right)^3 = y$ ______________________
10. $\left(\frac{4}{5}\right)^2 = \frac{16}{25}$ ______________________
11. $e^x = y$ ______________________
12. $e^{\frac{1}{2}} = x$ ______________________
13. $61^x = y$ ______________________
14. $22^{43} = y$ ______________________
15. $11^{\log_{11} 5} = x$ ______________________
16. $y = 9^{\log_9 x}$ ______________________
17. $64 = 4^x$ ______________________
18. $343 = 7^3$ ______________________
19. $71^x = 14.5$ ______________________
20. $9^{\log_2 8} = x$ ______________________

<u>(There is a back side to this)</u>

Convert the following Logarithmic Equations to Exponential Equations.

To do this, remember the circle trick we learned. The base of the log turns into the base of the exponential. The answer to the logarithmic equation is an exponent.

Ex 1: $\log_{105} 11025 = 2$ … Converts to $105^2 = 11025$

Ex 2: $\log_8 4096 = 4$ … Converts to $8^4 = 4096$

21. $\log_2 32 = 5$ ______________________
22. $\log_5 1 = 0$ ______________________
23. $\log_{10} 10 = 1$ ______________________
24. $\log_{10} 0.1 = -1$ ______________________
25. $\log_{\frac{1}{2}} 2 = -1$ ______________________
26. $\log_3 81 = 4$ ______________________
27. $\log_5 0.04 = -2$ ______________________
28. $\log_{\frac{1}{2}} 8 = -3$ ______________________
29. $\log_9 3 = 2$ ______________________
30. $\log_4 1024 = 5$ ______________________
31. $\log_5 \left(\frac{1}{5}\right) = -1$ ______________________
32. $\log_{36} \left(\frac{1}{6}\right) = -\frac{1}{2}$ ______________________
33. $\log_8 512 = 3$ ______________________
34. $\log_{14} 196 = 2$ ______________________

Evaluating Log Expressions.

To evaluate log expressions, you have to think about the expression as an exponential expression.

Ex 1: $\log_2 8 = 3$ This converts to $2^x = 8$. This equals 3. Since 2 raised to the 3rd power gives you 8.

35. $\log_5 125 =$ _____
36. $\log_7 343 =$ _____
37. $\log_8 1 =$ _____
38. $\log_{12} 12 =$ _____
39. $\log_6 36 =$ _____
40. $\log_4 16 =$ _____
41. $\log_9 729 =$ _____
42. $\log_7 2401 =$ _____
43. $\log_{\frac{1}{4}} \frac{1}{4} =$ ________
44. $\log_6 1 =$ ________
45. $\log 100 =$ _______
46. $\log_e 1 =$ ________

Algebra 2: Unit 1 Lesson 7 Worksheet
Converting and Evaluating Logs

Name: ____ Hour: _________

Convert the following exponential equations to logarithmic equations.

Ex 1: $144 = 12^2$. This would convert to: $\log_{12} 144 = 2$. The base of the log is the base of the exponential. The answer is always an exponent.

Ex 2: $\left(\frac{1}{4}\right)^2 = \left(\frac{1}{16}\right)$. This converts to: $\log_{\frac{1}{4}}\left(\frac{1}{16}\right) = 2$. Everything still goes in the same place as it did in example 1. The base became the base. The exponent is the answer.

Ex 3: $13^{\log_4 7} = x$. This converts to: $\log_{13} x = \log_4 7$. The base of the log is 13, since it's the base of the exponential. Then the answer is always the exponent, which in this case is $\log_4 7$.

1. $y = 3^x$ ______________________
2. $6859 = 19^3$ ______________________
3. $12^2 = 144$ ______________________
4. $\left(\frac{1}{2}\right)^3 = \frac{1}{8}$ ______________________
5. $\left(\frac{3}{7}\right)^3 = \frac{27}{343}$ ______________________
6. $\left(\frac{1}{2}\right)^5 = \frac{1}{32}$ ______________________
7. $\left(\frac{5}{8}\right)^4 = \frac{625}{4096}$ ______________________
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9. $\left(\frac{7}{12}\right)^3 = y$ ______________________
10. $\left(\frac{4}{5}\right)^2 = \frac{16}{25}$ ______________________
11. $e^x = y$ ______________________
12. $e^{\frac{1}{2}} = x$ ______________________
13. $61^x = y$ ______________________
14. $22^{43} = y$ ______________________
15. $11^{\log_{11} 5} = x$ ______________________
16. $y = 9^{\log_9 x}$ ______________________
17. $64 = 4^x$ ______________________
18. $343 = 7^3$ ______________________
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20. $9^{\log_2 8} = x$ ______________________

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Convert the following Logarithmic Equations to Exponential Equations.

To do this, remember the circle trick we learned. The base of the log turns into the base of the exponential. The answer to the logarithmic equation is an exponent.

Ex 1: $\log_{105} 11025 = 2$ … Converts to $105^2 = 11025$

Ex 2: $\log_8 4096 = 4$ … Converts to $8^4 = 4096$

21. $\log_2 32 = 5$ ______________________

22. $\log_5 1 = 0$ ______________________

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31. $\log_5 \left(\frac{1}{5}\right) = -1$ ______________________

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43. $\log_{\frac{1}{4}} \frac{1}{4} =$ ________

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Algebra 2: Unit 1 Lesson 7 Worksheet
Converting and Evaluating Logs

Name: ____ Hour: _________

Convert the following exponential equations to logarithmic equations.

Ex 1: $144 = 12^2$. This would convert to: $\log_{12} 144 = 2$. The base of the log is the base of the exponential. The answer is always an exponent.

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20. $9^{\log_2 8} = x$ ____________________

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Convert the following Logarithmic Equations to Exponential Equations.

To do this, remember the circle trick we learned. The base of the log turns into the base of the exponential. The answer to the logarithmic equation is an exponent.

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Algebra 2: Unit 1 Lesson 7 Worksheet
Converting and Evaluating Logs

Name: ____ Hour: _________

Convert the following exponential equations to logarithmic equations.

Ex 1: $144 = 12^2$. This would convert to: $\log_{12} 144 = 2$. The base of the log is the base of the exponential. The answer is always an exponent.

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1. $y = 3^x$ ______________________
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Convert the following Logarithmic Equations to Exponential Equations.

To do this, remember the circle trick we learned. The base of the log turns into the base of the exponential. The answer to the logarithmic equation is an exponent.

Ex 1: $\log_{105} 11025 = 2$ … Converts to $105^2 = 11025$

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Algebra 2: Unit 1 Lesson 7 Worksheet
Converting and Evaluating Logs

Name: ____ Hour: _________

Convert the following exponential equations to logarithmic equations.

Ex 1: $144 = 12^2$. This would convert to: $\log_{12} 144 = 2$. The base of the log is the base of the exponential. The answer is always an exponent.

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Ex 3: $13^{\log_4 7} = x$. This converts to: $\log_{13} x = \log_4 7$. The base of the log is 13, since it's the base of the exponential. Then the answer is always the exponent, which in this case is $\log_4 7$.

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Algebra 2: Unit 1 Lesson 7 Worksheet
Converting and Evaluating Logs

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Algebra 2: Unit 1 Lesson 7 Worksheet
Converting and Evaluating Logs

Name: ____ Hour: _________

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40. $\log_4 16 =$ _____

41. $\log_9 729 =$ _____

42. $\log_7 2401 =$ _____

43. $\log_{\frac{1}{4}} \frac{1}{4} =$ ________

44. $\log_6 1 =$ ________

45. $\log 100 =$ _______

46. $\log_e 1 =$ ________

Algebra 2: Unit 1 Lesson 7 Worksheet
Converting and Evaluating Logs

Name: ____ Hour: _________

Convert the following exponential equations to logarithmic equations.

Ex 1: $144 = 12^2$. This would convert to: $\log_{12} 144 = 2$. The base of the log is the base of the exponential. The answer is always an exponent.

Ex 2: $\left(\frac{1}{4}\right)^2 = \left(\frac{1}{16}\right)$. This converts to: $\log_{\frac{1}{4}}\left(\frac{1}{16}\right) = 2$. Everything still goes in the same place as it did in example 1. The base became the base. The exponent is the answer.

Ex 3: $13^{\log_4 7} = x$. This converts to: $\log_{13} x = \log_4 7$. The base of the log is 13, since it's the base of the exponential. Then the answer is always the exponent, which in this case is $\log_4 7$.

1. $y = 3^x$ _____________________
2. $6859 = 19^3$ _____________________
3. $12^2 = 144$ _____________________
4. $\left(\frac{1}{2}\right)^3 = \frac{1}{8}$ _____________________
5. $\left(\frac{3}{7}\right)^3 = \frac{27}{343}$ _____________________
6. $\left(\frac{1}{2}\right)^5 = \frac{1}{32}$ _____________________
7. $\left(\frac{5}{8}\right)^4 = \frac{625}{4096}$ _____________________
8. $\left(\frac{2}{3}\right)^4 = \frac{16}{81}$ _____________________
9. $\left(\frac{7}{12}\right)^3 = y$ _____________________
10. $\left(\frac{4}{5}\right)^2 = \frac{16}{25}$ _____________________
11. $e^x = y$ _____________________
12. $e^{\frac{1}{2}} = x$ _____________________
13. $61^x = y$ _____________________
14. $22^{43} = y$ _____________________
15. $11^{\log_{11} 5} = x$ _____________________
16. $y = 9^{\log_9 x}$ _____________________
17. $64 = 4^x$ _____________________
18. $343 = 7^3$ _____________________
19. $71^x = 14.5$ _____________________
20. $9^{\log_2 8} = x$ _____________________

(There is a back side to this)

Convert the following Logarithmic Equations to Exponential Equations.

To do this, remember the circle trick we learned. The base of the log turns into the base of the exponential. The answer to the logarithmic equation is an exponent.

Ex 1: $\log_{105} 11025 = 2$ … Converts to $105^2 = 11025$

Ex 2: $\log_8 4096 = 4$ … Converts to $8^4 = 4096$

21. $\log_2 32 = 5$ ______________________
22. $\log_5 1 = 0$ ______________________
23. $\log_{10} 10 = 1$ ______________________
24. $\log_{10} 0.1 = -1$ ______________________
25. $\log_{\frac{1}{2}} 2 = -1$ ______________________
26. $\log_3 81 = 4$ ______________________
27. $\log_5 0.04 = -2$ ______________________
28. $\log_{\frac{1}{2}} 8 = -3$ ______________________
29. $\log_9 3 = 2$ ______________________
30. $\log_4 1024 = 5$ ______________________
31. $\log_5 \left(\frac{1}{5}\right) = -1$ ______________________
32. $\log_{36} \left(\frac{1}{6}\right) = -\frac{1}{2}$ ______________________
33. $\log_8 512 = 3$ ______________________
34. $\log_{14} 196 = 2$ ______________________

Evaluating Log Expressions.

To evaluate log expressions, you have to think about the expression as an exponential expression.

Ex 1: $\log_2 8 = 3$ This converts to $2^x = 8$. This equals 3. Since 2 raised to the 3rd power gives you 8.

35. $\log_5 125 =$ _____
36. $\log_7 343 =$ _____
37. $\log_8 1 =$ _____
38. $\log_{12} 12 =$ _____
39. $\log_6 36 =$ _____
40. $\log_4 16 =$ _____
41. $\log_9 729 =$ _____
42. $\log_7 2401 =$ _____
43. $\log_{\frac{1}{4}} \frac{1}{4} =$ ________
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Algebra 2: Unit 1 Lesson 7 Worksheet
Converting and Evaluating Logs

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Algebra 2: Unit 1 Lesson 7 Worksheet
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24. $\log_{10} 0.1 = -1$ ______________________

25. $\log_{\frac{1}{2}} 2 = -1$ ______________________

26. $\log_3 81 = 4$ ______________________

27. $\log_5 0.04 = -2$ ______________________

28. $\log_{\frac{1}{2}} 8 = -3$ ______________________

29. $\log_9 3 = 2$ ______________________

30. $\log_4 1024 = 5$ ______________________

31. $\log_5 \left(\frac{1}{5}\right) = -1$ ______________________

32. $\log_{36} \left(\frac{1}{6}\right) = -\frac{1}{2}$ ______________________

33. $\log_8 512 = 3$ ______________________

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Evaluating Log Expressions.

To evaluate log expressions, you have to think about the expression as an exponential expression.

Ex 1: $\log_2 8 = 3$ This converts to $2^x = 8$. This equals 3. Since 2 raised to the 3rd power gives you 8.

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37. $\log_8 1 =$ _____

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42. $\log_7 2401 =$ _____

43. $\log_{\frac{1}{4}} \frac{1}{4} =$ ________

44. $\log_6 1 =$ ________

45. $\log 100 =$ _______

46. $\log_e 1 =$ ________

Algebra 2: Unit 1 Lesson 7 Worksheet
Converting and Evaluating Logs

Name: ____ Hour: _________

Convert the following exponential equations to logarithmic equations.

Ex 1: $144 = 12^2$. This would convert to: $\log_{12} 144 = 2$. The base of the log is the base of the exponential. The answer is always an exponent.

Ex 2: $\left(\frac{1}{4}\right)^2 = \left(\frac{1}{16}\right)$. This converts to: $\log_{\frac{1}{4}}\left(\frac{1}{16}\right) = 2$. Everything still goes in the same place as it did in example 1. The base became the base. The exponent is the answer.

Ex 3: $13^{\log_4 7} = x$. This converts to: $\log_{13} x = \log_4 7$. The base of the log is 13, since it's the base of the exponential. Then the answer is always the exponent, which in this case is $\log_4 7$.

1. $y = 3^x$ ____________________
2. $6859 = 19^3$ ____________________
3. $12^2 = 144$ ____________________
4. $\left(\frac{1}{2}\right)^3 = \frac{1}{8}$ ____________________
5. $\left(\frac{3}{7}\right)^3 = \frac{27}{343}$ ____________________
6. $\left(\frac{1}{2}\right)^5 = \frac{1}{32}$ ____________________
7. $\left(\frac{5}{8}\right)^4 = \frac{625}{4096}$ ____________________
8. $\left(\frac{2}{3}\right)^4 = \frac{16}{81}$ ____________________
9. $\left(\frac{7}{12}\right)^3 = y$ ____________________
10. $\left(\frac{4}{5}\right)^2 = \frac{16}{25}$ ____________________
11. $e^x = y$ ____________________
12. $e^{\frac{1}{2}} = x$ ____________________
13. $61^x = y$ ____________________
14. $22^{43} = y$ ____________________
15. $11^{\log_{11} 5} = x$ ____________________
16. $y = 9^{\log_9 x}$ ____________________
17. $64 = 4^x$ ____________________
18. $343 = 7^3$ ____________________
19. $71^x = 14.5$ ____________________
20. $9^{\log_2 8} = x$ ____________________

(There is a back side to this)

Convert the following Logarithmic Equations to Exponential Equations.

To do this, remember the circle trick we learned. The base of the log turns into the base of the exponential. The answer to the logarithmic equation is an exponent.

Ex 1: $\log_{105} 11025 = 2$ … Converts to $105^2 = 11025$

Ex 2: $\log_8 4096 = 4$ … Converts to $8^4 = 4096$

21. $\log_2 32 = 5$ ____________________
22. $\log_5 1 = 0$ ____________________
23. $\log_{10} 10 = 1$ ____________________
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