Algebra II Logs STATION 1

~~Solve~~ for x. NO CALCULATOR. Show ALL WORK!!

Key Name_____ Per_____

1. $8^x = 32$

$2^{3x} = 2^5$

$\boxed{x = 5/3}$

2. $27^{x+5} = 9^{2x-3}$

$3^{3x+15} = 3^{4x-6}$

$-x = -9$ $x = 21$

$\boxed{x = 9}$

3. $16^{5x} = 64^{x+7}$

$4^{10x} = 4^{3x+21}$

$7x = 21$

$\boxed{x = 3}$

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

$2^{-2x+4} = 2^{9x-3}$

$\boxed{x = \frac{7}{11}}$

5. $\left(\frac{1}{49}\right)^{x} = 7^{6-3x}$

$7^{-2x} = 7^{6-3x}$

$\boxed{x = 6}$

Solve for x. ~~USE A CALCULATOR~~. Show ALL WORK!!

6. $\log_2 x = 4$

$2^4 = x$

$\boxed{x = 16}$

7. $\log_3(3x-6) = 4$

$3^4 = 3x - 6$

$81 = 3x - 6$

$3x = 87$

$\boxed{x = 29}$

8. $\log_2 x + \log_2 6 = 3$

$\log_2 6x = 3$

$2^3 = 6x$

$6x = 8$

$x = 8/6 = \frac{4}{3}$

9. $\log\ (x+3) - \log\ (x+1) = 2$

$\log \frac{(x+3)}{(x+1)} = 2$

$100 = \frac{x+3}{x+1}$

$100x + 100 = x + 3$

$99x = -97$

$\boxed{x = \frac{-97}{99}}$

10. $2\log_5 x - 1 = \log_5 3$

$\log_5 x^2 - \log_5 3 = 1$

$\log_5 \frac{x^2}{3} = 1$

$\frac{x^2}{3} = 5$

$x^2 = 15$

$\boxed{x = \sqrt{15}}$

Algebra II Logs STATION 2 Name_____ Per_____

Solve for x. USE A CALCULATOR. Show ALL WORK!! Round to nearest thousandth

1. $5^x = 19$

$\log_5 19 = x$

$\boxed{x = 1.829}$

2. $11^{3x-5} = 83$

$\log_{11} 83 = 3x - 5$

$\boxed{x = 2.281}$

3. $73 = 19^{2x-1} + 4$

$69 = 19^{2x-1}$

$\log_{19} 69 = 2x - 1$

$\boxed{x = 1.219}$

4. $47.1^{\frac{3x}{5}} - 2 = 55$

$47.1^{\frac{3x}{5}} = 57$

$\log_{47.1} 57 = \frac{3x}{5}$

$\boxed{x = 1.749}$

5. $475^{1.5x-14} - 42 = 87$

$475^{1.5x-14} = 129$

$\log_{475} 129 = 1.5x - 14$

$\frac{\log 129}{\log 475}$ $\boxed{x = 9.859}$

Use calc

Solve for x. USE A CALCULATOR. Show ALL WORK!! Round to nearest thousandth

6. $\log_3 x = 2.1$

$3^{2.1} = x$

$x = 10.045$

7. $\log_2(4x-1) = 3.7$

$2^{3.7} = 4x - 1$

$\boxed{x = 3.499}$

8. $\log_3 x + \log_3 5 = 2.6$

$\log_3 5x = -2.6$

$3^{-2.6} = 5x$

$\boxed{x = \cancel{.287}\ .011}$

9. $\log_2(x+1) - \log_2 x = 3.9$

$\log_2 \frac{x+1}{x} = 3.9$

$2^{3.9} = \frac{x+1}{x}$

$2^{3.9} \cdot x = x + 1$

$\boxed{x = .072}$

10. $2\log x - 3 = \log 7$

$\log x^2 - \log 7 = 3$

$\log \frac{x^2}{7} = 3$

$\frac{x^2}{7} = 10^3$

$x^2 = 7000$

$x = \sqrt{7000}$

$= 10\sqrt{70}$

Algebra II Logs STATION 3 Name_____ Per_____

Solve for x. Show ALL WORK!! Round to nearest thousandth when necessary

1. $25^{2x-4} = 5^{x+6}$

$5^{4x-8} = 5^{x+6}$

$3x = 14$

$\boxed{x = \frac{14}{3}}$

2. $6^{2x} = 29$

$\log_6 29 = 2x$

$\boxed{x = .940}$

3. $e^{2x-2} = 25$

$2x - 2 = \ln 25$

$\boxed{x = 2.609}$

4. $e^{x-2} = 2$

$x - 2 = \ln 2$

$\boxed{x = 2.693}$

5. $(e^x)^5 = 1000$

$\ln e^{5x} = \ln 1000$

$5x = \ln 1000$

$\boxed{x = 1.382}$

Solve for x. USE A CALCULATOR. Show ALL WORK!!

6. $\ln x = 3$

$e^3 = x$

$\boxed{x = 20.086}$

7. $\ln x^2 = 9$

$e^9 = x^2$

$\boxed{x = \pm 90.017}$

8. $\ln x + \ln 5 = 4$

$\ln 5x = 4$

$e^4 = 5x$

$\boxed{x = 10.920}$

9. $2\log x - 3 = \log 5$

$2\log x - \log 5 = 3$

$\log \frac{x^2}{5} = 3$

$10^3 = \frac{x^2}{5}$

$\boxed{x = 70.711}$

10. $2\ln x - \ln 4 = 6$

$\ln x^2 - \ln 4 = 6$

$\ln \frac{x^2}{4} = 6$

$e^6 = \frac{x^2}{4}$

$\boxed{x = 40.171}$

Algebra II Logs STATION 4 Key Name_____ Per_____

Write the equation for each, then solve the question. Use the half-life formula: $y = a(0.5)^x$ (Be careful, remember you need to do something extra!!)

1. The half-life of iodine-131 is 8.10 days. How long will take a 50g sample to decay to 6.25g?

$6.25 = 50(.5)^{t/8.10}$

$.125 = .5^{t/8.10}$

$\log_{.5} .125 = \frac{t}{8.10}$

$\boxed{t = 24.3 \text{ days}}$

2. The half-life of a certain bacterial is 3.7 hours. If the lab has a sample of 1000 bacteria, how many bacterial will be present after 15 hours?

$y = 1000(.5)^{\frac{15}{3.7}}$

.805 bacteria

$\boxed{\approx \cancel{297} \text{ bacteria} \approx 755 \text{ bacteria}}$

3. Joe has invested \$3000 in a savings account paying an annual interest rate of 1.5% compounded continuously. Find the balance after 4 years. $A = Pe^{rt}$

$A = 3000e^{.015 \cdot 4}$

$\boxed{\$3185.51}$

4. Mrs. Sillyhead has a credit card balance of \$1500.00, which she decides she does not want to pay. If her bank is charging her an annual rate of 27.5% compounded continuously, find how much she will owe in 5 years., (Not including fees.) $A = Pe^{rt}$

$A = 1500e^{.275 \cdot 5}$

$\boxed{\$5932.62}$

Algebra II Logs STATION 5 Name Key Per

Complete the table, graph, give the intercepts and the domain and range for each. Use a different color for each graph.

1. $y = 3^x$

x	y
-1	1/3
0	1
1	3
2	9
3	27

x-int. N/A

y-int. (0,1)

Domain: $\mathbb{R}$

Range: $y > 0$

$y = \log_3 x$

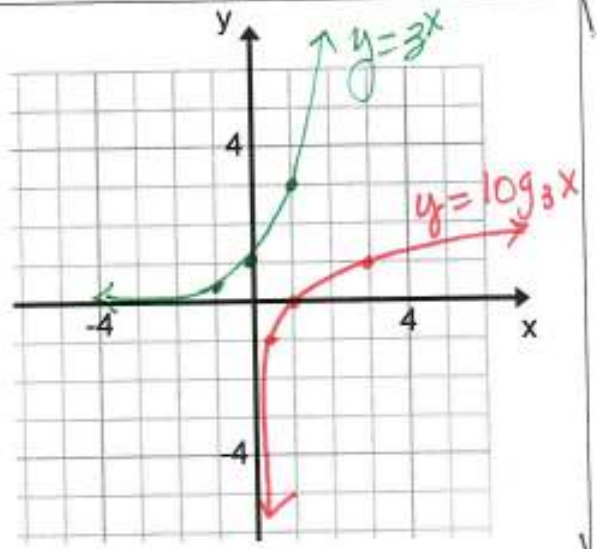
x	y
~~-1~~ 1/3	-1
~~0~~ 1	0
~~1~~ 3	1
~~2~~ 9	2
~~3~~ 27	3

x-int. (1,0)

y-int. N/A

Domain: $x > 0$

Range: $\mathbb{R}$



Algebra II Logs STATION 5 Name Key Per

Complete the table, graph, give the intercepts and the domain and range for each. Use a different color for each graph.

1. $y = e^x$

x	y
-1	.4
0	1
1	2.7
2	7.4
3	20.1

x-int. N/A

y-int. (0,1)

Domain: $\mathbb{R}$

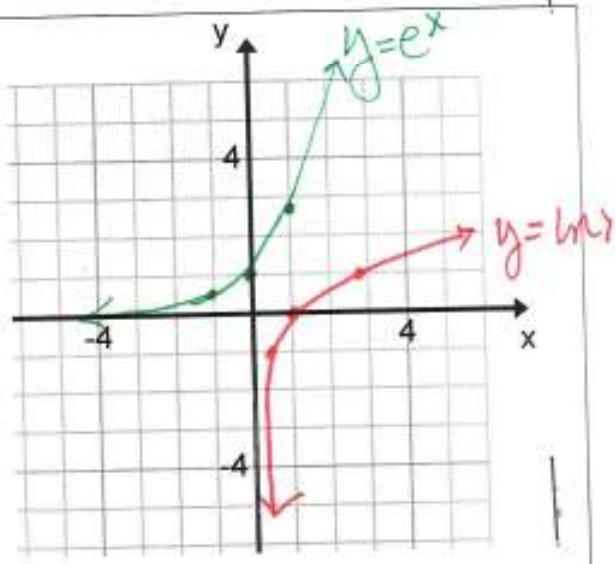
Range: $y > 0$

$y = \ln x$

x	y
~~-1~~ .4	-1
~~0~~ 1	0
~~1~~ 2.7	1
~~2~~ 7.4	2
~~3~~ 20.1	3

x-int. (1,0)

y-int. N/A

Domain: $x > 0$

Range: $\mathbb{R}$