Algebra 2 Honors
April 1 to April 27

Date	Topic	Assignment
Wednesday 4/1	**EOC English II**	
Thursday 4/2	Slant Asymptote – Bonus Assignment	Complete word problems
Monday 4/6	Review Rational Exponents	Worksheet
Tuesday 4/7	Solving Exponential Equations	Worksheet
Wednesday 4/8	Graphing Exponential Functions	Worksheet
Thursday 4/9	Introduction to Logarithms	P.503: 3-6, 8-19 all, 28-35 all, 38-44 even
Friday 4/10	Condense and Expand Logs (properties of logs)	Worksheet
Monday 4/13	Solving log equations (day 1)	Worksheet
Tuesday 4/14	Solving log equations (day 2)	Worksheet
Wednesday 4/15	Natural Logs	Worksheet
Thursday 4/16	Solving Exponential Equations using Logs	P.520: 12-23 all, 48, 49, 52, 53
Friday 4/17	Log Parent Graph	Worksheet
Monday 4/20	Log and Exponential Word Problems (Day 1)	Worksheet
Tuesday 4/21	Log and Exponential Word Problems (Day 2)	Worksheet
Wednesday 4/22	Log and Exponential Word Problems (Day 3)	Worksheet
Thursday 4/23	Solving Log and Exponential Inequalities	P.527: 1-12all
Friday 4/24	Review for Test	
Monday 4/27	**Test 4.3 - Log and Exponentials, Graphing and Word Problems**	

Review of Rational Exponents - Monday, 4/6
Simplify

1) $\sqrt[3]{-27}$

2) $81^{\frac{1}{2}} - 81^{\frac{-1}{2}}$

3) $\dfrac{49^{x+3}}{7^{x-2}}$

4) $(3^{-1}+3^{-2})^{-1}$

5) $9^{x-2}\cdot 3^{x-2}$

6) $(2x^{-3})^{-4}$

7) $\dfrac{16^{\frac{3}{4}}}{16^{\frac{1}{4}}}$

8) $\dfrac{x^{3y-2}}{x^{y+1}}$

9) $(5x^{-2})(3x)$

10) $\left(\dfrac{1}{5}\right)^{-2} + 2^{0}$

11) $x^{\frac{1}{2}}x^{\frac{1}{3}}$

12) $\dfrac{4x^{-2}y^{3}}{-8x^{4}y^{-5}}$

13) $\dfrac{2^{3x+y}}{2^{x+y}}$

14) $\left(6x^{-2}\right)^{-1}$

15) $8^{\frac{-2}{3}}$

Solving Exponential Equations - Tuesday, 4/7

1) $9^{3x+3}=3^{x+1}$ 2) $5^{4-2x}=25^{x}$ 3) $\left(\frac{1}{4}\right)^{x}=16^{x-1}$ 4) $\left(\sqrt{6}\right)^{x}=36^{2x+1}$ 5) $2^{x}\cdot 4^{3x}=2^{5x+1}$

6) $\frac{5^{4x+3}}{25^{x}}=5^{x-5}$ 7) $2^{x+2}=\frac{1}{16}$ 8) $5^{x}=\sqrt{125}$ 9) $3^{2-x}=0$ 10) $4^{x+3}=32^{x}$

11) $6^{x}=6\sqrt{6}$ 12) $3^{2x}=9\sqrt{3}$ 13) $9^{5x+2}=3^{3-x}$ 14) $2^{2x+3}=1$ 15) $\sqrt{2^{x}}=\sqrt[3]{2}$

Graphing Exponential Functions - Wednesday, 4/8

I. For each: (a) state the domain and range, (b) find the intercepts, (c) find the asymptote, (d) state the transformations, (e) make a sketch of the graph.

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

5.) $y=\left(\frac{1}{3}\right)^{x}$ 6.) $y=2\left(3^{x}\right)+1$ 7.) $y=-3^{x}$ 8.) $y=3^{x+2}-1$

9.) $y=-4^{x}-2$ 10.) $y=5^{-x-2}+1$ 11.) $y=-\frac{1}{2}\left(4^{x}\right)+2$ 12.) $y=6^{x}$

II. For each: (a) state the domain and range, (b) find the intercepts, (c) find the asymptote, (d) state the transformations, (e) make a sketch of the graph.

13.) $y=2\left(e^{x}\right)-1$ 14.) $y=-\left(e^{x-2}\right)+1$ 15. $y=3e^{x-2}$ 16. $y=e^{-x}+2$

IV. Solve for x. Show all work.

17.) $3^{x}=\frac{1}{27}$ 18.) $8^{2+x}=2$ 19.) $4^{2x+5}=16^{x+1}$ 20.) $6^{x+1}=36^{x-1}$

Properties of Logs - Friday, 4/10

I. Rewrite each expression as a sum and/or difference of logarithms. (i.e. expand)

1) $\log\frac{5x^{4}}{(x-2)}$ 2) $\log_{7}\left[\frac{\sqrt[3]{5x^{2}}}{x(x+2)}\right]$ 3) $\log_{2}5\sqrt[3]{x+3}$ 4) $\log\frac{4\sqrt{3}}{\sqrt[3]{7}}$

5) $\log\left[\frac{x(x+2)}{(x+3)^{2}}\right]$ 6) $\log_{3}\left[\frac{2x^{2}}{y(x-2)}\right]$ 7) $\log_{5}\left[\frac{25x^{3}}{y^{\frac{3}{2}}}\right]$ 8) $\log_{2}\left(\frac{x^{2}}{x-3}\right)$

II. Express as a logarithm of a single number or expression. (i.e. condense)

9) $\frac{1}{3}\log_{4}p-\log_{4}r-2\log_{4}a$ 10) $\log_{5}x-\log_{5}y+2$ 11) $\log_{2}M+\log_{2}N+3$

12) $\log_{5}M+\frac{1}{4}\log_{5}N-2$ 13) $1-3\log_{5}x$ 14) $\frac{1+\log_{9}x}{2}$

III. Simplify.

15) $\log_{7}\sqrt[3]{49}$ 16) $\log_{\frac{1}{2}}(8)$ 17) $\log\frac{1}{\sqrt{1000}}$ 18) $\log_{4}40-\log_{4}5$

19) $2\log_{3}6-\log_{3}4$ 20) $4^{\log_{2}(2^{\log_{2}5})}$ 21) $4^{\frac{1}{3}\log_{4}(27)}$ 22) $\log_{2}(4)^{\frac{3}{2}}$

Solving Log Equations (Day 1) - Monday, 4/13

1) $\log_2(x+2)+\log_2 5=4$ 2) $\log_4(2x+1)-\log_4(x-2)=1$ 3) $\log_4(x-4)+\log_4 x=\log_4 5$

4) $\log(x+1)=2$ 5) $\log_x(x^2+8)=\log_2 x+\log_2 6$ 6) $\log_3 x+\log_3(x-2)=1$

7) $\log_3(x-2)=3$ 8) $2\log_b x=8$ 9) $\log_x 64=3$

10) $\log_4 x^3=9$ 11) $\log_e \frac{x}{e}=2$ 12) $\log 5+\log x^2=2$

13) $\ln x-\ln(x-1)=\ln 2$ 14) $(\log_2 x)^2=16$ 15) $\log_m x+\log_m(x+3)=\log_m 10$

Solving Log Equations (Day 2) - Tuesday, 4/14

1) $\log_x 8=\frac{3}{4}$ 2) $\log_2 8\sqrt[3]{2}=x$ 3) $\log_9(\log_4 x)=\frac{1}{2}$

4) $\log_a x=\frac{-3}{2}\log_a 9+\log_a 2$ 5) $\log_3(x+2)+\log_3 6=3$ 6) $\log_3(\log_2(\log_5 25))=x$

7) $\log_a(3x-5)-\log_a(x-5)=\log_a 8$ 8) $\log_b(x^2+7)=\frac{2}{3}\log_b 64$ 9) $\log_5(\log_3 x)=0$

10) $\log_a x=2\log_a 3+\log_a 5$ 11) $\log_x 16=-\frac{2}{5}$ 12) $\log_x 1=0$

Natural Logs - Wednesday, 4/15

I. Simplify. If the expression is undefined, say so.

1) $\ln e^4$ 2) $\ln e^7$ 3) $\ln\frac{1}{e^5}$ 4) $\ln\sqrt{e}$ 5) $\ln 1$ 6) $\ln(-1)$

7) $e^{\ln 1.2}$ 8) $e^{\ln\sqrt{3}}$ 9) $\ln\frac{1}{\sqrt{e}}$ 10) $e^{\ln 5-\ln 4}$ 11) $\ln 0$ 12) $\ln e\sqrt{e}$

II. Write as a single logarithm of a number or expression.

13) $\ln 3+\ln 4$ 14) $2\ln 3-\ln 5$ 15) $\ln 8-\ln 2$ 16) $\ln 7+\frac{1}{2}\ln 9$ 17) $4\ln 2-\ln 3-1$ 18) $\frac{\ln 4+5}{2}$

IV. Solve for x. Leave answers in terms of "e" , if necessary.

19) $\ln\frac{1}{x}=2$ 20) $\ln(x-4)=-1$ 21) $\ln x=3$ 22) $\ln x^2=9$ 23) $\ln\sqrt{x}=3$ 24) $\ln|x|=1$

25) $\ln(x+2)=7$ 26) $e^{\ln x}=1-2x$ 27) $\ln e^x=-1$ 28) $\ln x=\frac{-1}{2}$ 29) $\ln x=\frac{1}{3}$ 30) $x=\ln e^{\frac{3}{4}}$

31) $|\ln x|=1$ 32) $\ln x+\ln(x+3)=\ln 10$ 33) $2\ln x=\ln(x+1)$ 34) $\ln(\ln x)=0$

Log Parent Graph - Friday, 4/17

I. For the following: state the transformations, domain, range, intercepts, asymptote and then sketch a graph.

1) $y=\log_3(x+1)+2$ 2) $g(x)=-2\log_4(x)+3$ 3) $y=2\log_3(-x)-4$ 4) $y=\log_{\frac{1}{2}}(x+8)$

5) $f(x)=\log_3(-x+3)+2$ 6) $y=-\frac{1}{2}\log_3(x-3)$ 7) $f(x)=-\ln(x-2)+4$ 8) $y=2\ln(x+1)-2$

II. For each, state the transformations. DO NOT Graph!

9) $y=\frac{1}{5}\log_4(x-1)+4$ 10) $y=3\log_2(-(x-1))$

III. Mixed Problems. For the following: state the transformations, domain, range, intercepts, asymptote and then sketch a graph.

11) $y=2\cdot 3^{x-1}$ 12) $y=\ln(x-1)$ 13) $y=\frac{1}{2}\log_2(-x+4)$ 14) $y=-3e^{x+1}-4$

15) $y=-3\log_2 x$ 16) $y=2e^{-x}+5$

IV. For each graph the function and its inverse on the same axes. State domain , range, intercepts and asymptotes for both the function and its inverse.

17) $y = e^{x+2} - 3$ 18) $y = -2^{x-1} + 4$

Log and Exponential Word Problems (Day 1) - Monday, 4/20

For each: Write the formula, show substitution into the formula, solve until in calculator ready form. Round answers to 3 decimal places. Write the answer in a complete sentence.

1) If Tanisha has $100 to invest at 8% per year compounded monthly, how long will it be before she has $150? If the compounded is continuous, how long will it be?

2) How long does it take for an investment to double in value if it is invested at 6% per year compounded monthly? Compounded continuously?

3) A business purchased for $650,000 in 1994 is sold in 1997 for $850,000. What is the annual rate of return on this investment? (Hint: this is an appreciation problem)

4) The number N of bacteria present in a culture at time "t" (in hours) obeys the equation $N = 1000e^{0.01t}$ After how many hours will the population equal 1500?

5) Jerome will be buying a new car for $15,000 in 3 years. How much money should he ask his parents for now so that, if he invests it at 5% compounded continuously, he will have enough to buy a car?

6) How many years will it take for an initial investment of $10,000 to grow to $25,000? Assume a rate of interest of 6% compounded continuously.

7) Jason uses his car for his job. He is allowed to depreciate the car 8% per year. IF the car was worth $23,000 new, in about how many years will the car be worth $3000?

Log and Exponential Word Problems (Day 2) - Tuesday, 4/21

For each: Write the formula, show substitution into the formula, solve until in calculator ready form. Round answers to 3 decimal places. Write the answer in a complete sentence.

1) At any time $t \geq 0$, in days, the number of bacteria present, *y*, is given by $y = Ce^{kt}$ where *k* is a constant. The initial population is 1000 and the population triples during the first 5 days.

a) Write an expression for *y* at any time $t \geq 0$.
b) By what factor will the population have increased in the first 10 days?
c) At what time, *t*, in days, will the population have increased by a factor of 6?

2) Four months ago after it stopped advertising, a manufacturing company noticed that its sales per unit "y" had dropped each month according to the function $y = 100{,}000e^{(-0.05x)}$ where "x" is the number of months after the company stopped advertising.

a) Find the projected drop in sales per unit six months after the company stops advertising.
b) How many months until sales per unit had dropped $50,000?

3) Let *P(t)* represent the number of wolves in a population at time *t* years, when $t \geq 0$. The population of wolves is given by $P(t) = 800 - Ce^{-kt}$

a) If $P(0) = 500$, find *P(t)* in terms of t and k.
b) If $P(2) = 700$, find *k*
c) As time increases without bound, what happens to the population of wolves? Support your answer with a graph and a written explanation.

4) There are 80 grams of Cobalt-58, which has a half-life of 71 days. How long will it take to have 13 grams remaining?

5) During a certain epidemic, the number of people that are infected at any time increases at a rate proportion to the number of people that are infected at that time. If 1000 people are infected when the epidemic is first discovered and 1200 are infected 7 days later, how many people are infected 12 days after the epidemic is first discovered?

6) The following data represents the price and quantity supplied in 1997 for IBM personal computers.

Price ($/Computer)	2300	2000	1700	1500	1300	1200	1000
Quantity Supplied	180	173	160	150	137	130	113

(a)Use your calculator draw the scatter plot. Use price as the independent variable. Label your axes.
(b) Use your calculator to fit a logarithmic model to this data.

Log and Exponential Word Problems (Day 3) - Wednesday, 4/22

1) The half-life of radium is 1690 years. If 10 grams are present now, how much will be present in 50 years?

2) A hard-boiled egg has a temperature of 98 degrees Celsius. If it is put into a sink that maintains a temperature of 18 degrees Celsius, its temperature x minutes later is given by the formula $T(x) = 18 + 80e^{-0.28x}$. Hilda needs her egg to be exactly 30 degrees Celsius for decorating. How long should she leave it in the sink?

3) Ten years ago Michael paid $250 for a rare 1823 stamp. Its current value is $1000. Find the average annual rate of growth.

4) A new car that cost $12,000 decreased in value to $4000 in 5 years. Find the average annual rate of depreciation.

5) Buzz Lightyear is returning to Earth in his spaceship when he detects an oxygen leak. He knows that the rage of change of the pressure id directly proportional to the pressure of the remaining oxygen.

a) Write an equation that expresses this fact.
b) Solve you equation subject to the initial condition that the pressure is 3000 psi at time t = 0 when Buzz discovers the leak.
c) Five hours after he discovers the leak, the pressure has dropped to 2300 psi. At the time, Buzz is still 15 hours from Earth. Will he make it home before the pressure drops to 800 psi?

6) Tanya has just inherited a diamond ring appraised at $5000. If diamonds have appreciated in value at an annual rate of 8%, what was the value of the ring 10 years ago when the ring was purchased?

7) Bacteria in a certain cultures increase at a rate proportion to the number present. If the number of bacteria doubles in three hours, in how many hours will the number of bacteria triple?

8) How long will it take an investment of $1000 to triple in value if it is invested at an annual rate of 12% compounded quarterly?