Midterm Review – Chapter 7
Class Review
Honors Algebra 2

* check sols. to your log equations!

Name Key 2014-15

Hour_____ Date_____

Solve each equation.

Together:

1. $25^{x-4} = 5^{3x+1}$

$(5^2)^{x-4} = 5^{3x+1}$

$5^{2x-8} = 5^{3x+1}$

$2x-8 = 3x+1$

$-x = 9$

$x = -9$

Practice:

2. $8^{x-1} = 2^{x+2}$

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

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

$3x-3 = x+2$

$2x = 5$

$x = 5/2$

3. $\log_7(5-x) = \log_7 3x$

$5-x = 3x$

$5 = 4x$

$5/4 = x$ ✓

4. $\ln(7-2x) = \ln(3x+3)$

$7-2x = 3x+3$

$-5x = -4$

$x = 4/5$ ✓

5. $\log_2(3x-1) = 8$

$2^8 = 3x-1$

$256 = 3x-1$

$257 = 3x$

$257/3 = x$ ✓

6. $\log_7(2-x) = 3$

$7^3 = 2-x$

$343 = 2-x$

$341 = -x$

$-341 = x$ ✓

7. $3e^{3x} - 1 = 1$

$3e^{3x} = 2$

$e^{3x} = 2/3$

$3x = \ln 2/3$

$x = \frac{\ln(2/3)}{3}$

$x = -0.135$ ✓

8. $10^{2x-3} + 3 = 19$

$10^{2x-3} = 16$

$2x-3 = \log(16)$

$x = \frac{(\log(16)+3)}{2} = 2.102$ ✓

9. $\log(x+2) = 4$

$10^4 = x+2$

$10^4 - 2 = x$

$9,998 = x$ ✓

10. $\ln(x+7) = 4$

$e^4 = x+7$

$e^4 - 7 = x$

$47.598 = x$ ✓

11. Evaluate $\log_4 12$ $= 1.792$

12. Evaluate $\log_5 36$ $= 2.227$

13. Growth or Decay?

$y = \frac{1}{4}e^x$ $e > 1 \rightarrow$ Growth

14. Growth or Decay?

$y = 2(0.875)^x$ $0 < 0.875 < 1 \rightarrow$ Decay

15. Expand $\ln(3x^3y)$

$= \ln 3 + \ln x^3 + \ln y$

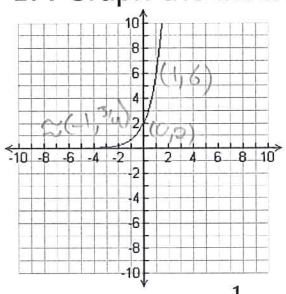
$= \ln 3 + 3\ln x + \ln y$

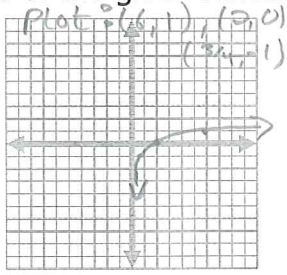
16. Expand $\log \frac{x^2}{3}$

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

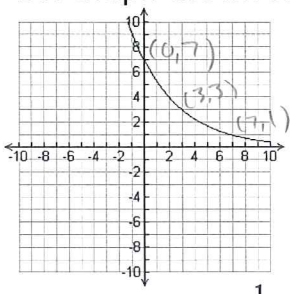
$= 2\log x - \log 3$

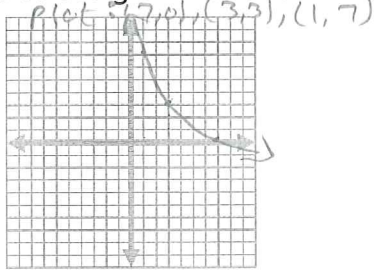
17. Graph the inverse of the given function.





18. Graph the inverse of the given function.





19. Write $2^{-3} = \frac{1}{8}$ in logarithmic form.

$\log_2 \frac{1}{8} = -3$

20. Write $3^{-5} = \frac{1}{243}$ in logarithmic form.

$\log_3 \left(\frac{1}{243}\right) = -5$

21. You deposit $475 in an account that pays 2.5% interest compounded continuously. find the balance after 10 years of investing.

$A = 475e^{(0.025 \cdot 10)} = \$609.91$

$\star A = Pe^{rt}$

22. You deposit $2,500 in an account that pays 3% interest compounded quarterly. Find the balance after 8 years of investing.

$A = 2500\left(1 + \frac{0.03}{4}\right)^{(4 \cdot 8)}$

$= \$3,175.28$

$\star A = P\left(1 + \frac{r}{n}\right)^{nt}$

23. Alex bought a car for $18,500. Each year the value of the car declines exponentially at a rate of 18% per year.

a. Write an exponential model for the car's value.

$Y = 18,500\ (1 - 0.18)^x$

$Y = 18,500\ (0.82)^x$

b. How much will the car be worth 7 years later?

$Y = 18,500(0.82)^7$

$= \$4,611.78$

Midterm Review – Chapter 7
Practice Time
Honors Algebra 2

Name_____

Hour_____ Date_____

1. Evaluate $\log_3 43$ 3.424

2. Expand $\log 5x^3y^2$.

$= \log 5 + \log x^3 + \log y^2$

$= \log 5 + 3\log x + 2\log y$

3. Expand $\ln \frac{2x^5y^4}{z^2}$

$= \ln 2x^5y^4 - \ln z^2$

$= \ln 2 + \ln x^5 + \ln y^4 - \ln z^2$

$= \ln 2 + 5\ln x + 4\ln y - 2\ln z$

4. Condense $4\log_6 x + \frac{1}{3}\log_6 64$.

$= \log_6 x^4 + \log_6 (64^{1/3})$ ($\uparrow 4$)

$= \log_6 4x^4$

5. Solve $2\log_6 4 - \frac{1}{3}\log_6 8 = \log_6 x$.

$\log_6 4^2 - \log_6 8^{1/3} = \log_6 x$

$\log_6 16 - \log_6 2 = \log_6 x$

$\log_6 8 = \log_6 x$

$8 = x$ ✓

6. Solve $25^{x+4} = 5^{x^2-7}$.

$(5^2)^{x+4} = 5^{x^2-7}$

$5^{2x+8} = 5^{x^2-7}$

$2x+8 = x^2-7$

$-2x-8$

$0 = x^2 - 2x - 15$

$0 = (x-5)(x+3)$

$x = 5, -3$ ✓

7. Solve $\log_2 (5x - 1) = \log_2 (3x + 7)$.

$5x - 1 = 3x + 7$

$2x = 8$

$x = 4$ ✓

8. Solve $\log_4 (x + 2) + \log_4 (x - 4) = 2$.

$\log_4 (x+2)(x-4) = 2$

$\log_4 (x^2 - 2x - 8) = 2$

$x^2 - 2x - 8 = 16$

$x^2 - 2x - 24 = 0$

$(x-6)(x+4) = 0$

$x = 6, -4$ ✗

9. If you deposit \$750 in an account that compounds interest continuously at a rate of 3.25%, when will you have \$1200?

$1200 = 750e^{(0.0325 \cdot t)}$

$\frac{750}{750} = \frac{750e^{0.0325t}}{750}$

$\frac{8}{5} = e^{0.0325t}$

$\frac{0.0325t}{0.0325} = \frac{\ln(\frac{8}{5})}{0.0325}$

$t \approx 14.462$ years later

10. You deposit $1475 in a bank account. Find the balance after 3 years for the account that pays 2.75% interest compounded daily.

$A = 1475\left(1 + \frac{0.0275}{365}\right)^{(365 \cdot 3)}$

$= \$1,601.84$

11. The tuition for one year at Eastern Michigan University is $9,025. If tuition increases 4.25% per year, write an equation to model the situation and calculate the cost of tuition 1 year from now.

$y = 9,025(1 + 0.0425)^x$

$y = 9,025(1.0425)^x$

$y = 9,025(1.0425)^1 = \$9,408.56$

12. Which of the following is an exponential decay function? $0 < b < 1$

a. $y = 2(5)^x$ b. $y = 2e^x$ c. $y = 2(.5)^x$ d. $y = -2(5)^x$

13. Write $10^{-2} = 0.01$ in logarithmic form $\log(0.01) = -2$

14. Write $\log_9 27 = \frac{3}{2}$ in exponential form $9^{3/2} = 27$

15. Solve $2\log_2 x - \log_2 (x + 3) = 2$

$\log_2 x^2 - \log_2 (x+3) = 2$

$\log_2 \frac{x^2}{x+3} = 2$

$\frac{x^2}{x+3} = 4$

$x^2 = 4x + 12$

$x^2 - 4x - 12 = 0$

$(x-6)(x+2) = 0$

$x = 6, -2$ ✓

16. Solve $10^{3x+1} = 27$

$\log 27 = 3x + 1$

$\frac{(\log(27) - 1)}{3} = x$

$0.144 = x$ ✓

17. Solve $-3e^{2x} + 17 = -4$

$-3e^{2x} = -21$

$e^{2x} = 7$

$\ln 7 = 2x$

$\frac{\ln(7)}{2} = x$

$0.973 = x$ ✓

18. Solve $\ln x = 5$

$e^5 = x$

$148.413 = x$

Midterm Review – Chapter 7
Summative Ticket - VA
Honors Algebra 2

Name_____

Hour_____ Date_____

Solve each equation. (1 pt each)

1. $9^x = 3^{x+4}$

$(3^2)^x = 3^{x+4}$

$2x = x+4$

$x = 4$

2. $\log_3(x+5) = \log_3 5x$

$x+5 = 5x$

$5 = 4x$

$5/4 = x$

3. $3\ln x - 7 = 4$

$3\ln x = 11$

$\ln x = 11/3$

$x = e^{11/3}$

$x = 39.121$

4. $3^x - 4 = 6$

$3^x = 10$

$\log_3 10 = x$

$2.096 = x$

Midterm Review – Chapter 7
Summative Ticket - VA
Honors Algebra 2

Name_____

Hour_____ Date_____

Solve each equation. (1 pt each)

1. $9^x = 3^{x+4}$

2. $\log_3(x+5) = \log_3 5x$

3. $3\ln x - 7 = 4$

4. $3^x - 4 = 6$

5. Expand the expression. (1 pt)

$\log(4x^3y)$

$= \log 4 + \log x^3 + \log y$

$= \log 4 + 3\log x + \log y$

6. Condense the expression. (1 pt)

$2\ln 5 - 2\ln x + \ln y$

$= \ln 5^2 - \ln x^2 + \ln y$

$= \ln \frac{25}{x^2} + \ln y$

$= \ln\left(25y/x^2\right)$

7. Julie invests $3,000 into an account that pays 4.25% interest compounded semi-annually. How much money would be in Julie's account in 20 years?

$A = 3000\left(1 + \frac{0.0425}{2}\right)^{(2 \cdot 20)}$

$= \$6,956.71$

5. Expand the expression. (1 pt)

$\log(4x^3y)$

6. Condense the expression. (1 pt)

$2\ln 5 - 2\ln x + \ln y$

7. Julie invests $3,000 into an account that pays 4.25% interest compounded semi-annually. How much money would be in Julie's account in 20 years?

Midterm Review – Chapter 7
Summative Ticket - VB
Honors Algebra 2

Name_____

Hour_____ Date_____

1. Expand the expression. (1 pt)
$\log(4x^3y)$

2. Condense the expression. (1 pt)
$2\ln 5 - 2\ln x + \ln y$

3. Julie invests $3,000 into an account that pays 4.25% interest compounded semi-annually. How much money would be in Julie's account in 20 years?

Midterm Review – Chapter 7
Summative Ticket - VB
Honors Algebra 2

Name_____

Hour_____ Date_____

1. Expand the expression. (1 pt)
$\log(4x^3y)$

2. Condense the expression. (1 pt)
$2\ln 5 - 2\ln x + \ln y$

3. Julie invests $3,000 into an account that pays 4.25% interest compounded semi-annually. How much money would be in Julie's account in 20 years?

Solve each equation. (1 pt each)

4. $9^x = 3^{x+4}$

5. $\log_3(x+5) = \log_3 5x$

6. $3\ln x - 7 = 4$

7. $3^x - 4 = 6$

Solve each equation. (1 pt each)

4. $9^x = 3^{x+4}$

5. $\log_3(x+5) = \log_3 5x$

6. $3\ln x - 7 = 4$

7. $3^x - 4 = 6$