Algebra 2 w/Support

Name_____

# Review for Logs Test

Date_____ Period

**Solve each equation.**

1) $6^{-3x} = 6^{2x}$

$-3x = 2x$

$+3x \quad +3x$

$0 = 5x \rightarrow x = 0$

2) $2^{-2n} = 32$

$2^{-2n} = 2^5$

$-2n = 5$

$n = 5/-2$

3) $8^{-3n} = 16^{-n-3}$

$(2^3)^{-3n} = (2^4)^{-n-3}$

$-9n = -4n - 12$

$-5n = -12$

$n = 12/5$

4) $4^{2x+3} = 64$

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

$2x+3 = 3$

$2x = 3 \rightarrow x = 3/2$

5) $4^{-3v} = \frac{1}{64}$

$4^{-3v} = 4^{-3}$

$-3v = -3$

$v = 1$

6) $5^{3x} = 625$

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

$3x = 3$

$x = 1$

**Solve each equation. Round your answers to the nearest ten-thousandth.**

7) $17^a = 27$

$\log_{17} 27 = a$

$\frac{\log 27}{\log 17} = a \rightarrow a = 1.1633$

8) $e^b = 63$

$\ln e^b = \ln 63$

$b = 4.1431$

9) $10^{9x} = 70$

$\log_{10} 70 = 9x$

$\frac{\log 70}{\log 10} = 9x \rightarrow 1.8451 = 9x$

$0.2050 = x$

10) $7^{x+7} = 67$

$\log_7 67 = x+7$

$\frac{\log 67}{\log 7} = x+7 \rightarrow 2.1608 = x+7$

$-4.8392 = x$

11) $18^{k-4} - 6 = 71$

$18^{k-4} = 77$

$\log_{18} 77 = k-4$

$\frac{\log 77}{\log 18} = k-4 \rightarrow 1.5029 = k-4$

$+4 \quad +4$

$5.5029 = k$

12) $e^{5n} + 8 = 31$

$e^{5n} = 23$

$5n = \ln(23)$

$5n = 3.1354$

$n = 0.6271$

CR Algebra II - Log Application Practice Name:

1. Adam invested $400 in a CD that pays out 5.5% percent interest compounded monthly. What is the amount after 11 years?

$A = A$
$P = 400$
$r = 0.055$
$n = 12$
$t = 11$

$A = 400\left(1 + \frac{0.055}{12}\right)^{12 \cdot 11}$

$A = \$731.49$

2. Sarah has a savings bond that will be worth $15,000 in 10 years. The interest rate of the bond is 8.25% that is compounded semi-annually. Find the present value of the bond.

$A = 15000$
$P = x$
$r = 0.0825$
$n = 2$
$t = 10$

$15000 = P\left(1 + \frac{0.0825}{2}\right)^{20}$

$\$668330 = P$

3. $1000 is invested at 4.7% in an account that is compounded continuously. How long will it take for the account to double?

$A = 2000$
$P = 1000$
$r = 0.047$
$n = e$
$t = t$

$2000 = 1000\, e^{0.047t}$

$2 = e^{0.047t}$

$\ln 2 = 0.047t$

$14.75 \text{ years} = t$

4. How much money did Jenifer invest 10 years ago in an account that has a rate of 6% compounded continuously if he has a current balance of $4008.66?

$A = 4008.66$
$P = P$
$r = 0.06$
$t = 10$
$e$

$\frac{4008.66}{e^{0.06(10)}} = P e^{0.06(10)}$

$2200 = P$

5. Tim invested $5000 in a bond that has an interest rate of 7.65% compounded quarterly. The current value of the bond is $6500. How long did Tom leave his money invested?

$A = 6500$
$P = 5000$
$r = 0.0765$
$n = 4$
$t = t$

$6500 = 5000\left(1 + \frac{0.0765}{4}\right)^{4t}$

$1.3 = \left(1 + \frac{0.0765}{4}\right)^{4t}$

$1.3 = (1.019)^{4t}$

$\log_{1.019}(1.3) = 4t$

$\frac{\log 1.3}{\log 1.019} = 4t$

$13.849 = 4t$

$t = 3.5$ years

6. If $1000 is invested in an account that is compounded continuously for 8 years, the account grows to $3800. What would the interest rate be on the account?

$A = 3800$
$P = 1000$
$r = r$
$n = e$
$t = 8$

$3800 = 1000\, e^{r(8)}$

$3.8 = e^{8r}$

$\frac{\ln(3.8)}{8} = \frac{8r}{8}$ $\quad r = 0.167$

## GROWTH AND DECAY:

7. The mice population is 15,000 and is decreasing by 13% each year. Write a formula for this situation. What will be the mice population after 2.5 years?

$A=$
$P=15000$
$r=0.13$
$t=2.5$

$A=15000(1-0.13)^{2.5}$
$A=\$10589.84$

8. Teachers in Georgia are promised a 3% raise in yearly salary every year for the next 5 years. Write a formula for teachers' salaries. If a teacher is making $62,000 now, how much will they be making in 5 years?

$A=62000(1-0.03)^5$
$A=\$53241.51$

9. The number of mosquitoes at the beach has increased 42% every year since 1999. In 1999, there were 2,500 mosquitoes. Write a formula for this situation. How many mosquitoes would you predict were at the beach in 2020?

$A=2500(1+0.42)^{21}$
$A=3944530$ mosquitos

10. The llama population has been growing by 2.5% every year. There are currently 1.08 million llamas in 2018. Write a formula for the llama population. Then use it to predict the population in the year 2027. $A=1.08(1+0.025)^t$

$A=1.08(1+0.025)^9=1.35$ million llamas

11. A new computer was purchased for $1250. The value of the computer depreciates at a rate of 7.1% per year. Write a formula for the value of the computer. How much will the computer be worth in 4 years?

$A=1250(1-0.071)^t$
$A=1250(1-0.071)^4=\$931.05$

12. A new car was purchased for $51,999. The value of a new car of this model depreciates at a rate of 17% for year. Write a formula for the car's value. What will the value of the car be in 6 years?

$A=51{,}999(1-0.17)^t$
$A=51{,}999(1-0.17)^6=\$17000.57$