Name: _____

Date: _____ Pd: ____

Unit 2 Test REVIEW KEY

Show all of your work on a separate sheet of paper.

Simplify each expression.

1) $\dfrac{3x^4y^7 \cdot 5x^3y^4 \cdot 6x}{5x^{-3}y^5} = 18x^{11}y^6$

2) $\dfrac{\left(3pm^{-2}q^0\right)^{-2} \cdot 5m^{-4}p^6}{5pq^4} = \dfrac{p^3}{9q^4}$

Condense each expression into a single logarithm.

3) $5\log m + 5\log n - 5\log p$

$\quad = \log\dfrac{m^5n^5}{p^5} = \log\left(\dfrac{mn}{p}\right)^5$

4) $\frac{1}{4}\ln d + \frac{1}{4}\ln e$

$\quad = \ln\sqrt[4]{de}$

Expand each logarithm.

5) $\log\sqrt[5]{a \cdot b \cdot c}$

$\quad = \frac{1}{5}\log a + \frac{1}{5}\log b + \frac{1}{5}\log c$

6) $\ln\dfrac{g^6h^4}{i^7}$

$\quad = 6\ln g + 4\ln h - 7\ln i$

Solve each equation. Round your answers to the nearest hundredth if necessary.

7) $6^{-5x} = 6^{3x-1}$

$\quad x = \frac{1}{8}$

8) $2^{r+2} = 1$

$\quad r = -2$

9) $5^{4x-5} + 5 = 91$

$\quad x \approx 1.94$

10) $-8 \cdot 9^{-5x} = 49$

$\quad$ No Solution

11) $\log_8(-32 - 3n) = \log_8(n^2 + 9n)$

$\quad$ No Solution (Neither $x = -8$ or $x = -4$ will work.)
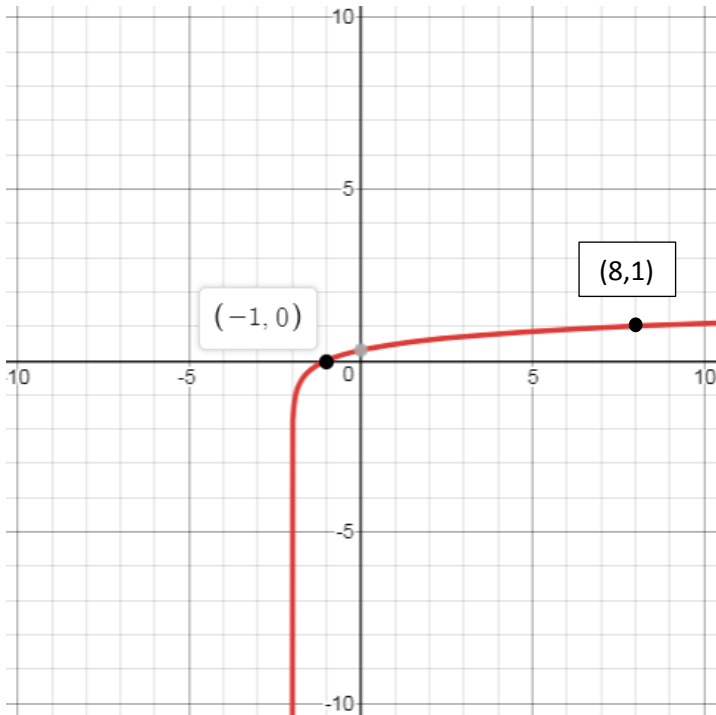
12) $\log(3x - 9) = \log(2x + 6)$

$\quad x = 15$

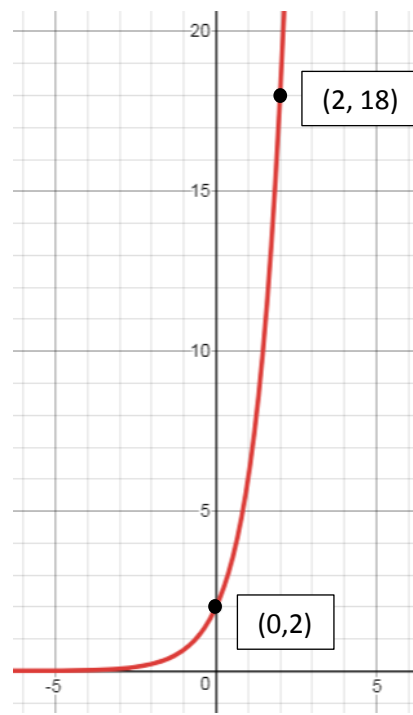13) $\log_6(x + 5) - \log_6 x = 2$

$\quad x = \frac{1}{7}$

14) $\ln(2x - 3) + \ln 3 = \ln 18$

$\quad x = \frac{9}{2} = 4.5$

Graph each function. You MUST graph at least 2 points. NO RANDOM CURVES WILL BE ACCEPTED!

15) $y = \log(x + 2)$

(−1, 0) (8,1)

16) $y = 2 \cdot 3^x$

(2, 18) (0,2)

Solve each problem. Be sure you answer the questions completely!

17) Brenda invests $4,672 into a savings account with a fixed annual interest rate of 8% compounded quarterly. What will be the account balance after 5 years?

$6,942.35

18) Jasmine invests $6,231 into a retirement account with a fixed annual interest rate of 7% compounded continuously. What will be the account balance after 15 years?

$17,806.02

19) Ryan invests a sum of money in a savings account with a fixed annual interest rate of 5% compounded monthly. After 9 years, the amount in the account is $11,359.64. What was the amount of the initial investment?

$7,250

20) Hakeem invests $6,575 into an account that is compounded semi-annually. After 7 years, the amount in the account is $11,385.77. What was the annual interest rate?

8%

21) An adult takes 200 mg of ibuprofen. Each hour the amount of ibuprofen in the person's system decreases by about 29%. How much ibuprofen is left after 3 hours?

71.58 mg

22) In 1970, the population of a city was about 278,000. Since then, the city population has grown at an average annual rate of 1.8%. About how many people lived in the city in 1985?

About 363,296 people

23) The half-life of Po-218 is three minutes. How much of a 2.0 gram sample would remain after 18 minutes?

0.03125 g

24) Selenium-83 has a half-life of 25.0 minutes. How many minutes would it take for a 10.0 mg sample to decay and have only 0.625 mg of it remaining?

100 minutes