Algebra 2 Name_____

Exponential, Logarithmic and other Word Problems HW Date_____ Period____

Find the inverse of each function.

1) $y = \left(\frac{3^x - 7}{-2}\right)^{\frac{1}{4}}$

2) $y = 6\log_2(x + 4) + 1$

3) $y = \left(\frac{e^x + 5}{4}\right)^{\frac{1}{2}}$

4) $y = \ln(2x^2 + 5)$

Assume that f is an exponential function. Find an equation for $f(x)$ using the exponential formula, $f(x) = ab^x$.

5) $f(1) = 6$ and $f(3) = 12$

6) $f(2) = 5$ and $f(5) = 15$

7) $f(-3) = 48$ and $f(2) = 12$

8) $f(-2) = -\frac{1}{80}$ and $f(3) = -\frac{1}{16}$

Tell whether or not the function could be an exponential function.

9) $f(1) = 4,\ f(5) = 8,\ f(9) = 16,\ f(13) = 32$

10) $f(4) = 3,\ f(6) = 18,\ f(9) = 108,\ f(11) = 648$

11) $f(6) = 24,\ f(-1) = 6,\ f(-8) = 1.5,\ f(-15) = \frac{3}{8}$

12) $f(3) = 100,\ f(0) = 20,\ f(-3) = 4,\ f(-6) = 0.2$

13) Icann Flie loves to handglide at a nearby beach. When he jumps off the escarpment he dives downward toward the water until the wind catches his hanglider, then he flies upward. Assume that his distance in feet from the water varies quadratically with the time since he started his flight. The escarpment is 105 feet above the water. Five seconds after he jumps he is 30 feet above the water. Five seconds later he is 21 feet above the water. Find the pareticular equation of this function expressing distance above the water in terms of seconds in flight. Use the general form of a quadratic, $y = ax^2 + bx + c$

14) How high is he at 4 seconds? 15 seconds?

15) What is his lowest point and when does it occur?

16) When will he reach a height of 200 feet?

17) Jenna and Lexa decide to have a bike race. Jenna lets Lexa have a head start. Let t = number of minutes since Lexa left. $L(t)$ = number of miles Lexa has biked. $J(t)$ = number of miles Jenna has biked. If $L(t) = 0.3t$ find $L(20)$ and $L(45)$.

18) If $J(t) = 0.4(t - 7)$ find $J(10)$ and $J(30)$.

19) When will Jenna catch up with Lexa? How long will it take?

20) When did Jenna leave?

21) If the race is 8 miles long, who will win?

22) If the race is 11 miles long, who will win?

23) How fast were Lexa and Jenna going?

24) You decide to plant asparagus in your kitchen garden. You first harvest 10 stalks in 1986. By 1988 you produce 30 stalks. Assume that the number of stalks you harvest varies exponentially with the number of years since you started harvesting the plants. Find the particular equation of this function expressing the number of stalks in terms of the time since you harvested.

25) When will you have 100 stalks?

26) According to the model, when did you harvest the first stalk?

27) What will be your production in the year 2000?

28) In 1950, a gallon of gas cost 25 cents. In 1986, the cost had risen to $1.02 per gallon. Assume that the cost of gas varies exponentially with the time. Find the particular equation of this function expressing the cost of gas in terms of time since 1950.

29) What was the cost of gas in 1962?

30) When does the gas cost $2.49 per gallon?

31) You start a walking program with a basic walk of 8 miles per week. Each week you increase your distance by 10% of the amount of the week before. What is the distance you walk in the eighth week?

32) What total distance have you walked in eight weeks?

33) Assume that the flag flying in front of your school loses 5% of its color each month due to fading. What amount of color was in the flag when it was new?

34) After 1 month, how much color remains? After 2? After 3?

35) How much color would be left after 1 year?

36) If the school kept the flag in use until it had 25% color, how many months would the flag be able to fly?

37) Your young cousin lends you three dollars at 3% per day interest. You agree to repay the loan in thirty days. What amount will you owe her at that time?

38) You forget to repay her on the 30th day and repay her on the 31st. How much more do you owe her?

39) A car depreciates in value each month that you own it. Assume that you paid $15,000 for a new car on September 5, 1988. The value of the car depreciates by .001 of its original value each month. What is its value on October 5, 1988?

40) What is its value one year after purchase?

41) What is the value when the 6 year warranty expires?

Algebra 2 Name_____

Exponential, Logarithmic and other Word Problems HW Date_____ Period____

Find the inverse of each function.

1) $y = \left(\frac{3^x - 7}{-2}\right)^{\frac{1}{4}}$

$y = \log_3(-2x^4 + 7)$

2) $y = 6\log_2(x + 4) + 1$

$y = 2^{\frac{x-1}{6}} - 4$

3) $y = \left(\frac{e^x + 5}{4}\right)^{\frac{1}{2}}$

$y = \ln(4x^2 - 5)$

4) $y = \ln(2x^2 + 5)$ $y = \left(\frac{e^x - 5}{2}\right)^{\frac{1}{2}}$

Assume that f is an exponential function. Find an equation for $f(x)$ using the exponential formula, $f(x) = ab^x$.

5) $f(1) = 6$ and $f(3) = 12$

$f(x) = 4.243 \cdot 1.414^x$

6) $f(2) = 5$ and $f(5) = 15$

$f(x) = 2.404 \cdot 1.442^x$

7) $f(-3) = 48$ and $f(2) = 12$

$f(x) = 20.893 \cdot 0.758^x$

8) $f(-2) = -\frac{1}{80}$ and $f(3) = -\frac{1}{16}$

$f(x) = -0.0238 \cdot 1.38^x$

Tell whether or not the function could be an exponential function.

9) $f(1) = 4,\ f(5) = 8,\ f(9) = 16,\ f(13) = 32$

Yes

10) $f(4) = 3,\ f(6) = 18,\ f(9) = 108,\ f(11) = 648$

No

11) $f(6) = 24,\ f(-1) = 6,\ f(-8) = 1.5,$
$f(-15) = \frac{3}{8}$

Yes

12) $f(3) = 100,\ f(0) = 20,\ f(-3) = 4,\ f(-6) = 0.2$

No

13) Icann Flie loves to handglide at a nearby beach. When he jumps off the escarpment he dives downward toward the water until the wind catches his hanglider, then he flies upward. Assume that his distance in feet from the water varies quadratically with the time since he started his flight. The escarpment is 105 feet above the water. Five seconds after he jumps he is 30 feet above the water. Five seconds later he is 21 feet above the water. Find the pareticular equation of this function expressing distance above the water in terms of seconds in flight. Use the general form of a quadratic, $y = ax^2 + bx + c$

$y = 1.32t^2 - 21.6t + 105$

14) How high is he at 4 seconds? 15 seconds?

39.72ft 78 ft

15) What is his lowest point and when does it occur?

16.6 ft above the water at 8.2 seconds

16) When will he reach a height of 200 feet?

20 seconds

17) Jenna and Lexa decide to have a bike race. Jenna lets Lexa have a head start. Let t = number of minutes since Lexa left. $L(t)$ = number of miles Lexa has biked. $J(t)$ = number of miles Jenna has biked. If $L(t) = 0.3t$ find $L(20)$ and $L(45)$.

6 and 13.5

18) If $J(t) = 0.4(t - 7)$ find $J(10)$ and $J(30)$.

1.2 and 9.2

19) When will Jenna catch up with Lexa? How long will it take?

in 8.4 miles after 28 minutes

20) When did Jenna leave?

7 minutes after Lexa

21) If the race is 8 miles long, who will win?

Lexa

22) If the race is 11 miles long, who will win?

Jenna

23) How fast were Lexa and Jenna going?

Lexa is .3 miles per minutes Jenna is .4 miles per mi

24) You decide to plant asparagus in your kitchen garden. You first harvest 10 stalks in 1986. By 1988 you produce 30 stalks. Assume that the number of stalks you harvest varies exponentially with the number of years since you started harvesting the plants. Find the particular equation of this function expressing the number of stalks in terms of the time since you harvested.

$y = 10 \cdot 1.732^x$

25) When will you have 100 stalks?

sometime in 1990

26) According to the model, when did you harvest the first stalk?

1981

27) What will be your production in the year 2000?

around 21,861

28) In 1950, a gallon of gas cost 25 cents. In 1986, the cost had risen to $1.02 per gallon. Assume that the cost of gas varies exponentially with the time. Find the particular equation of this function expressing the cost of gas in terms of time since 1950.

$y = 0.25 \cdot 1.0398^x$

29) What was the cost of gas in 1962?

$.40

30) When does the gas cost $2.49 per gallon?

toward the end of 2008

31) You start a walking program with a basic walk of 8 miles per week. Each week you increase your distance by 10% of the amount of the week before. What is the distance you walk in the eighth week?

15.59 miles

32) What total distance have you walked in eight weeks?

91.5 miles

33) Assume that the flag flying in front of your school loses 5% of its color each month due to fading. What amount of color was in the flag when it was new?

100%

34) After 1 month, how much color remains? After 2? After 3?

95%, 90.25%, 85.74%

35) How much color would be left after 1 year?

54%

36) If the school kept the flag in use until it had 25% color, how many months would the flag be able to fly?

27.03 months

37) Your young cousin lends you three dollars at 3% per day interest. You agree to repay the loan in thirty days. What amount will you owe her at that time?

$7.28

38) You forget to repay her on the 30th day and repay her on the 31st. How much more do you owe her?

$.22

39) A car depreciates in value each month that you own it. Assume that you paid $15,000 for a new car on September 5, 1988. The value of the car depreciates by .001 of its original value each month. What is its value on October 5, 1988?

$14,985

40) What is its value one year after purchase?

$14,821

41) What is the value when the 6 year warranty expires?

$13,943.50