Pre-Calculus

Name_____

Chapter 4 Take home Test

Period____

Evaluate each expression.

1) $\log_7 \dfrac{1}{343}$

2) $\log_7 -\dfrac{1}{49}$

Condense each expression to a single logarithm.

3) $\log_5 u + \log_5 v + \log_5 x + 3\log_5 w$

4) $5\log_5 7 + \dfrac{\log_5 10}{2} + \dfrac{\log_5 11}{2}$

Expand each logarithm.

5) $\log_7 \left(5 \cdot 11^5 \sqrt{12}\right)$

6) $\log_3 \left(\dfrac{x}{zy^4}\right)^2$

Identify the domain and range of each.

7) $f(x) = \log_{\frac{1}{5}} (3x - 6) - 1$

8) $f(x) = \log_2 (2x + 3) + 3$

Solve each equation, exact values only. NO DECIMALS.

9) $\log_9 (81 + 2n^2) = \log_9 3n^2$

10) $\log_{16} (3x^2 - 5x) = \log_{16} (14 + 2x^2)$

11) $\log_2 (x^2 + 5) - \log_2 5 = 4$

12) $\log_6 (x + 1) + \log_6 x = 1$

Rewrite each equation in logarithmic form.

13) $y^x = 72$

14) $16^b = a$

Rewrite each equation in exponential form.

15) $\log_{13} 169 = 2$

16) $\log_{15} n = m$

Use the properties of logarithms and the logarithms provided to rewrite each logarithm in terms of the variables given.

17) $\log_7 6 = X$
   $\log_7 10 = Y$
   $\log_7 8 = Z$
   Find $\log_7 \dfrac{343}{10}$

18) $\log_5 6 = X$
   $\log_5 11 = Y$
   $\log_5 8 = Z$
   Find $\log_5 \dfrac{15}{32}$

Solve each equation, exact values only. NO DECIMALS.

19) $27^{3v} = \left(\dfrac{1}{3}\right)^{2v - 3}$

20) $25^{-2n - 2} = \dfrac{1}{125}$

21) $6 \cdot 12^{-3n} = 51$
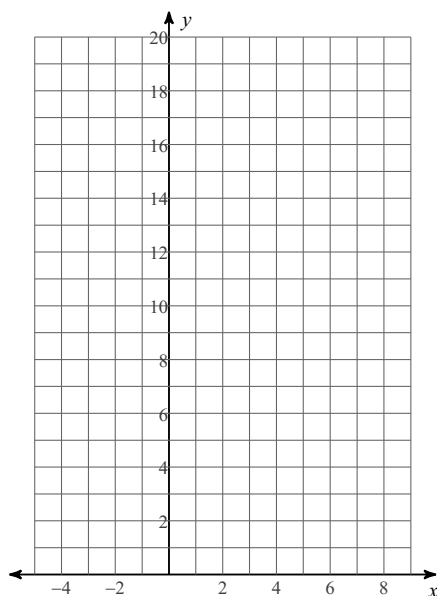
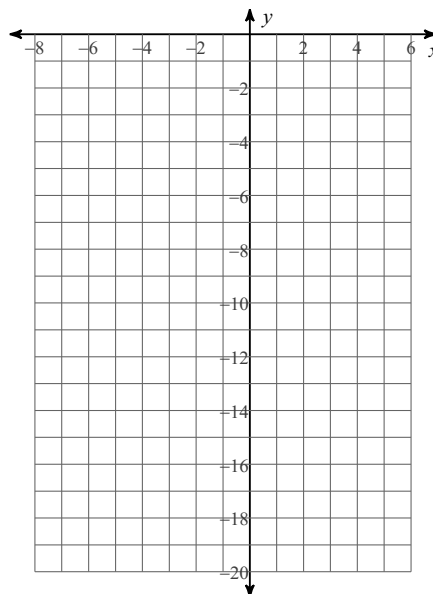22) $-10 \cdot 2^{3r} = 78$

Solve the exponential model.

23) A car engine runs at a temperature of 190°F. When the engine is turned off, it cools according to Newton's Law of Cooling with constant K = 0.0341, where the time is measured in minutes. Find the time needed for the engine to cool to 90°F if the surrounding temperature is 60°F.

-1-

Sketch the graph of each function.
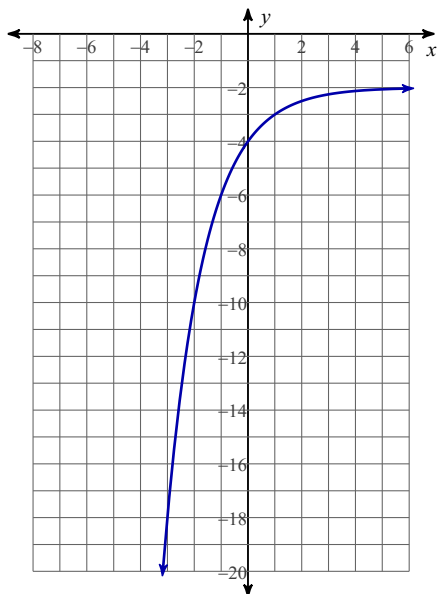
24) $f(x) = 3 \cdot 2^{x-2} + 1$

25) $f(x) = -\dfrac{1}{4} \cdot \left(\dfrac{1}{2}\right)^{x+1} - 2$
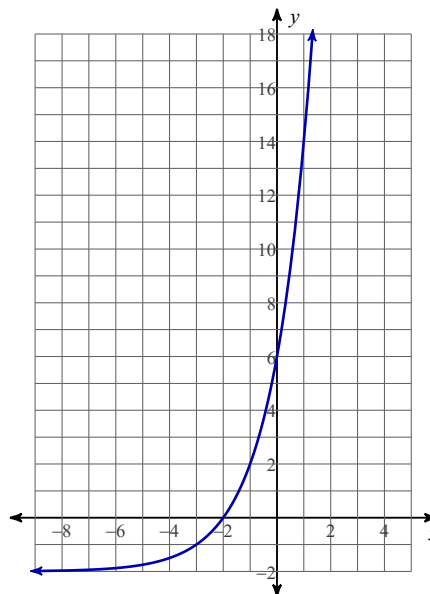
Write an equation for each graph.

26)

27)

28) A sample of bismuth-210 decayed to 33% of its original mass after 8 days.

    a.   Find the half-life of this element.

    b.   Find the mass remaining after 12 days.

29) Suppose that $12,000 is invested in a savings account paying 5.6% interest per year.

    a.   Write the formula for the amount in the account after t years if interest is compounded monthly.

    b.   Find the amount in the account after 3 years if interest is compounded daily.

    c.   How long will it take for the amount in the account to grow to $20,000 if interest is compounded semiannually?