

Chapter 4 Take home Test

Period _____

Evaluate each expression.

1) $\log_4 -16$

2) $\log_{16} \frac{1}{4}$

Condense each expression to a single logarithm.

3) $\log_4 a + 5 \log_4 b + 2 \log_4 c$

4) $6 \log_4 z + 6 \log_4 x - 3 \log_4 y$

Expand each logarithm.

5) $\log_5 (z \cdot x^2 \cdot y)^6$

6) $\log \left(\frac{(w \cdot u)^5}{v} \right)^3$

Identify the domain and range of each.

7) $f(x) = \log_2 (4x + 7) - 4$

8) $f(x) = \log_6 (4x + 16) - 3$

Solve each equation, exact values only. NO DECIMALS.

9) $\log_{16} (-14r - 2) = \log_{16} (r^2 + 43)$

10) $\log_{16} (x^2 + 75) = \log_{16} (17x + 3)$

11) $\log_2 (x + 6) + \log_2 x = 4$

12) $\ln x^2 + \ln 9 = 2$

Rewrite each equation in logarithmic form.

13) $b^{-13} = 118$

14) $3^3 = 27$

Rewrite each equation in exponential form.

15) $\log_{256} 16 = \frac{1}{2}$

16) $\log_4 m = n$

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

17) $\log_9 11 = R$

18) $\log 6 = R$

$\log_9 12 = S$

$\log 4 = S$

$\log_9 8 = T$

$\log 7 = T$

Find $\log_9 11979$

Find $\log \frac{400}{7}$

Solve each equation, exact values only. NO DECIMALS.

19) $16^{3-3x} = \left(\frac{1}{32} \right)^{-3x-2}$

20) $36^{-2m} \cdot 216^{2m-3} = \left(\frac{1}{36} \right)^{2m}$

21) $-7 \cdot 13^{n-7} = -25$

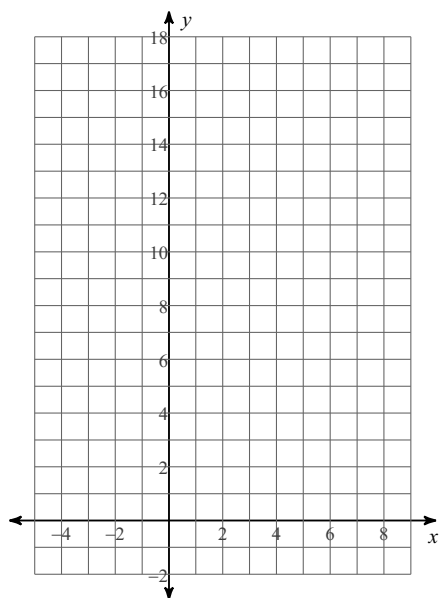
22) $2 \cdot 20^{n+2} = 27$

Solve the exponential model.

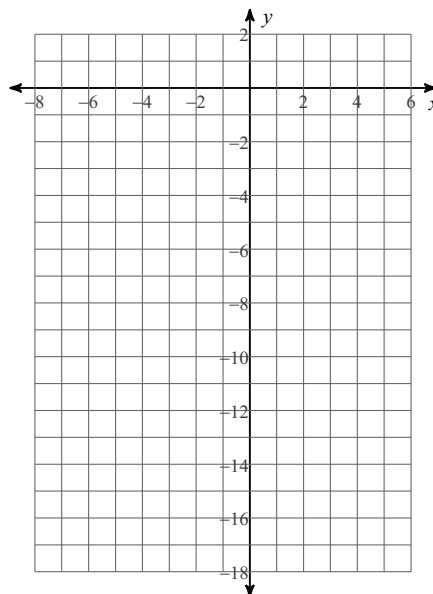
- 23) A car engine runs at a temperature of 190°F. When the engine is turned off, it cools according to Newton's Law of Cooling with constant $K = 0.0341$, where the time is measured in minutes. Find the time needed for the engine to cool to 90°F if the surrounding temperature is 60°F.

Sketch the graph of each function.

24) $f(x) = 4 \cdot 2^{x-2} - 2$

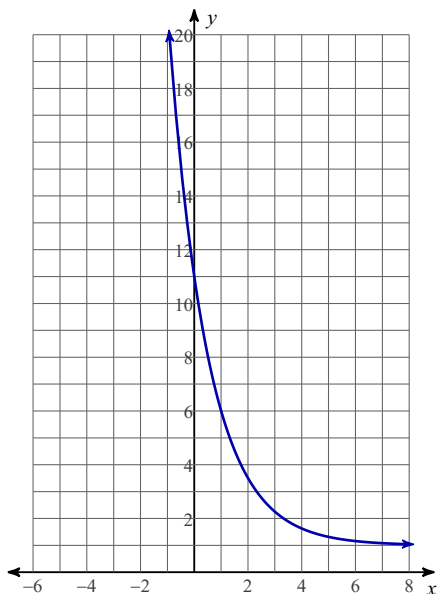


25) $f(x) = -3 \cdot \left(\frac{1}{2}\right)^{x+1} + 2$



Write an equation for each graph.

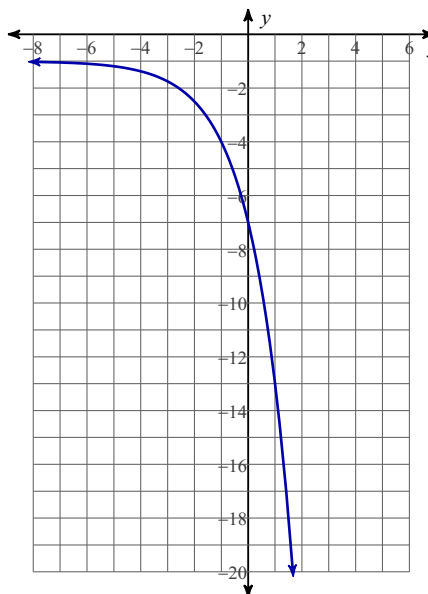
26)



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

- Find the half-life of this element.
- Find the mass remaining after 12 days.

27)



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

- Write the formula for the amount in the account after t years if interest is compounded monthly.
- Find the amount in the account after 3 years if interest is compounded daily.
- How long will it take for the amount in the account to grow to \$20,000 if interest is compounded semiannually?