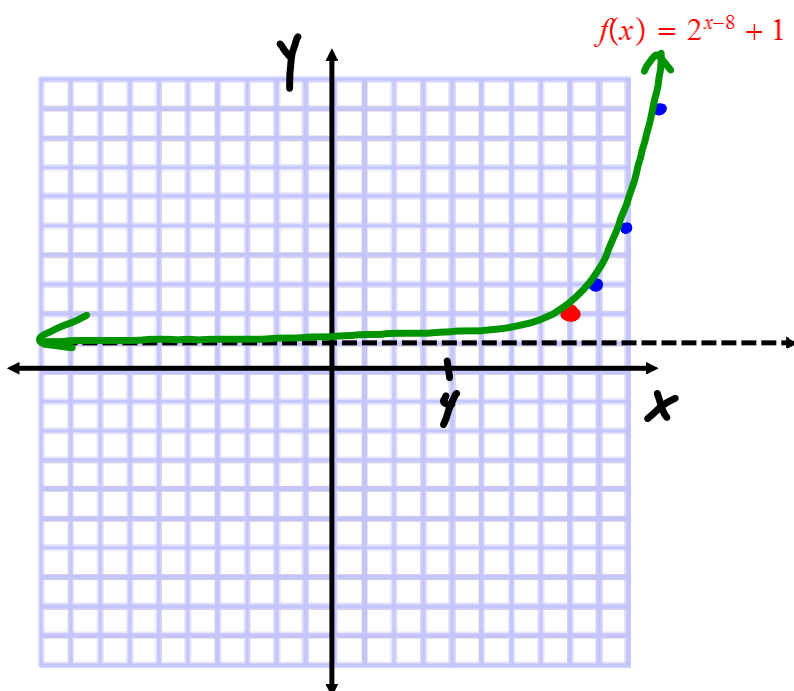


1) Section 7.2 (6 points) Sketch the graph of the function given below. Clearly identify the "key point". Give the domain and range of the function.



KEY POINT  
(8, 2)

x	y
8	2
9	3
10	5
11	9

DOMAIN: ALL REALS

RANGE:  $y > 1$

2) Section 7.3 (4 points) Evaluate the following logarithms.

$$\log_{12} 1 = 0$$

$$\log_2 \frac{1}{8} = -3$$

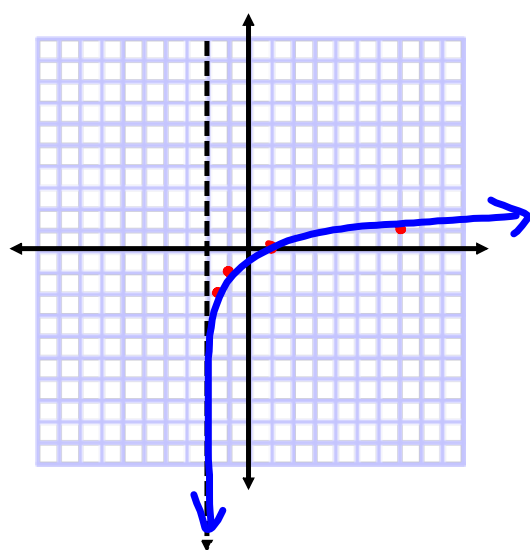
$$\log_4 64 = 3$$

$$\log_9 \frac{1}{3} = -\frac{1}{2}$$

$$\begin{aligned} 9^x &= \frac{1}{3} \\ 3^{2x} &= 3^{-1} \\ 2x &= -1 \\ x &= -\frac{1}{2} \end{aligned}$$

3) **Section 7.3** (6 points) Sketch the graph of the function given below. Clearly identify the "key point". Give the domain and range of the function.

$$f(x) = \log_3(x+2) - 1$$



x	y
$-\frac{2}{3}$	-2
-1	-1
1	0
7	1

KEY POINT  
 $(-1, -1)$

DOMAIN :  $x > -2$

RANGE : ALL REALS

4) Section 7.4 (4 points) Expand the expression below.

$$\begin{aligned}\log_3 \frac{6x^2y^{-1}}{5} &= \log_3 6x^2y^{-1} - \log_3 5 \\ &= \log_3 6 + \log_3 x^2 + \log_3 y^{-1} - \log_3 5 \\ &= \log_3 6 + 2\log_3 x - \log_3 y - \log_3 5\end{aligned}$$

5) Section 7.4 (4 points) Condense the expression given below into a single logarithm.

$$\frac{1}{3} \log_4 27 - \left( 2 \log_4 6 - \frac{1}{2} \log_4 81 \right)$$

$$\log_4 27^{\frac{1}{3}} - \left( \log_4 6^2 - \log_4 81^{\frac{1}{2}} \right)$$

$$\log_4 3 - \left( \log_4 36 - \log_4 9 \right)$$

$$\log_4 3 - \left( \log_4 \frac{36}{9} \right)$$

$$\log_4 3 - \log_4 4$$

$$\log_4 \frac{3}{4}$$

6) Section 7.4 (4 points) If  $\log_3 2 \approx .631$  and  $\log_3 7 \approx 1.771$ , find  $\log_3 28$

$$\begin{aligned}\log_3 28 &= \log_3 (2^2 \cdot 7) \\ &= \log_3 2^2 + \log_3 7 \\ &= 2 \log_3 2 + \log_3 7 \\ &\approx 2(.631) + 1.771 \\ &= 1.262 + 1.771 \\ &= 3.033\end{aligned}$$

7) Section 7.5/7.6 (5 points) Solve the exponential equation given below. Leave answer in exact form.

$$4^{2x-1} = 8^{3x+2}$$

$$4^{2x-1} = 8^{3x+2}$$

$$(2^2)^{2x-1} = (2^3)^{3x+2}$$

$$2^{4x-2} = 2^{9x+6}$$

$$4x-2 = 9x+6$$

$$-5x = 8$$

$$x = -\frac{8}{5}$$

8) Section 7.5/7.6 (5 points) Solve the exponential equation given below. Leave answer in exact form.

$$-12e^{-x} + 8 = 7$$

$$-12e^{-x} + 8 = 7$$

-8      -8

$$\frac{-12e^{-x}}{-12} = \frac{-1}{-12}$$

$$e^{-x} = \frac{1}{12}$$

$$\ln e^{-x} = \ln \frac{1}{12}$$

$$-x = \ln \frac{1}{12}$$

$$x = -\ln \frac{1}{12} = \ln \left(\frac{1}{12}\right)^{-1}$$

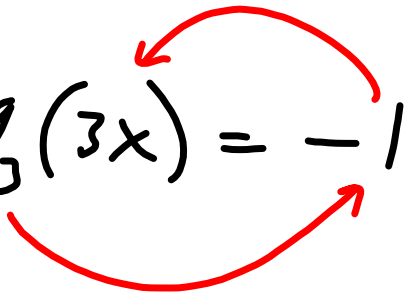
$$x = \ln 12$$



9) Section 7.5/7.6 (6 points) Solve the logarithmic equation given below. Leave answer in exact form.

$$-5 + 2\log_3(3x) = -7$$

$$2 \log_3(3x) = -2$$

$$\log_3(3x) = -1$$


$$3^{-1} = 3x$$

$$3x = \frac{1}{3}$$

$$x = \frac{1}{9}$$

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10) Section 7.5/7.6 (6 points) Solve the logarithmic equation given below. Leave answer in exact form.

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

$$\ln[(x-2)(2x-3)] = \ln x^2$$

$$(x-2)(2x-3) = x^2$$

$$2x^2 - 7x + 6 = x^2$$

$$x^2 - 7x + 6 = 0$$

$$(x-6)(x-1) = 0$$

$$x = \cancel{1}, 6$$

$$x = 6$$

11) Section 7.2 (5 points) Jadon would like to purchase two dogs and a computer for a total of \$1600. He currently has \$700 saved. How long will it take for his \$700 to grow to \$1600 if invested at 8% compounded continuously?

$$A = Pe^{rt}$$

$$\frac{1600}{700} = \frac{700 e^{.08t}}{700}$$

$$\frac{16}{7} = e^{.08t}$$

$$\ln \frac{16}{7} = \ln e^{.08t}$$

$$\ln \frac{16}{7} = .08t$$

$$t = \frac{\ln \frac{16}{7}}{.08}$$

$$t = \frac{\ln \frac{16}{7}}{.08} \cdot \frac{100}{100} = \frac{100 \ln \frac{16}{7}}{8}$$

$$= \frac{25}{2} \ln \frac{16}{7}$$