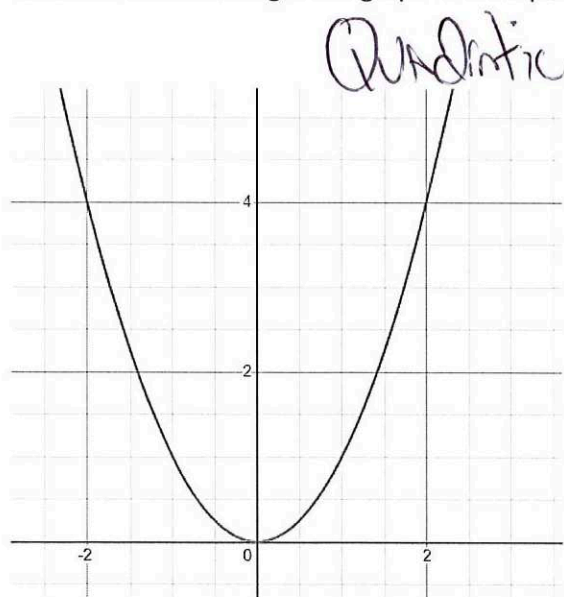


Assignment #20 Unit 3: Exponential, Power and Logarithmic Test Review #3

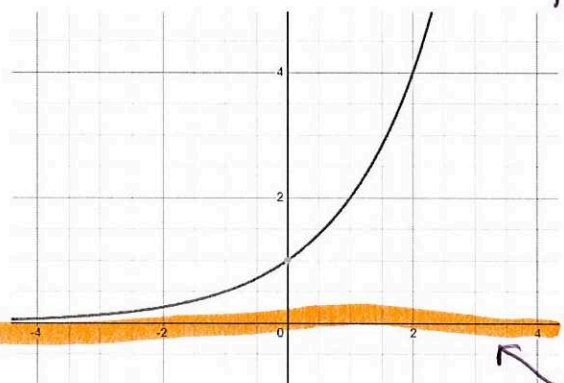
Which of the following is the graph of an exponential function?



Quadratic  $y = x^2$

Does this graph have any asymptotes?  
NO

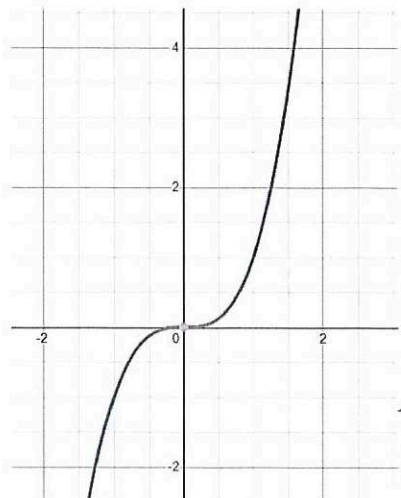
This IS An Exponential Graph



Does this graph have any asymptotes?  
Yes At  $y = 0$

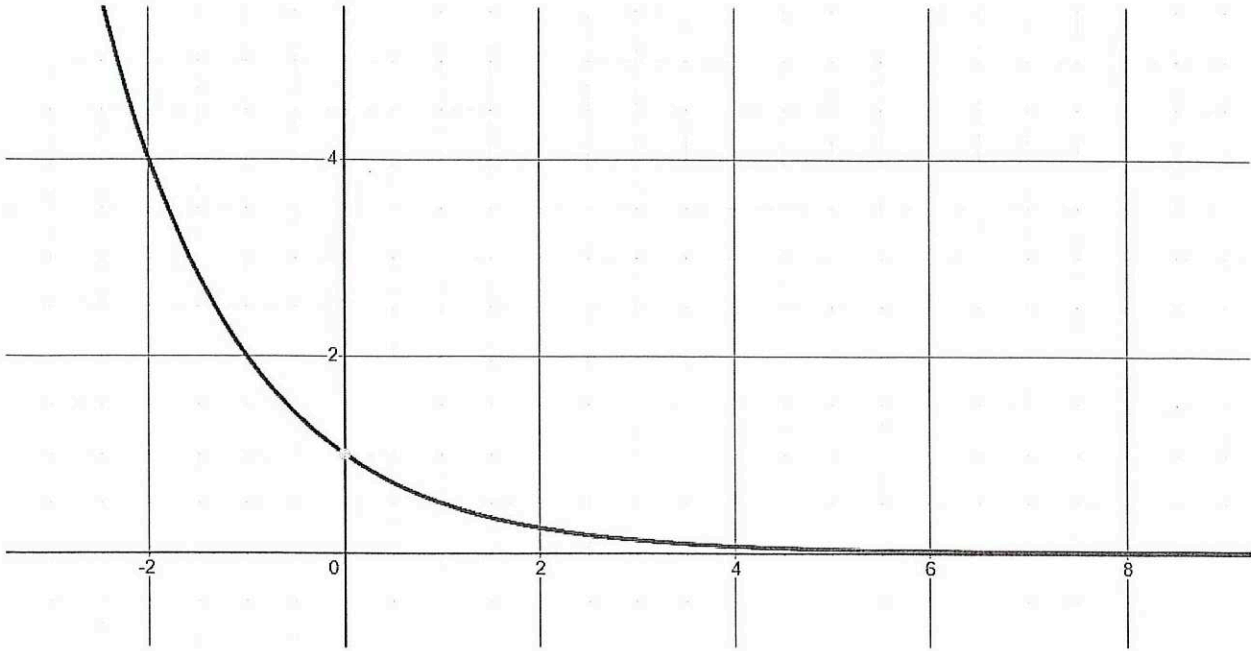
$y = 2^x$

Asymptote



Does this graph have any asymptotes?  
NO

This IS Cubic  $y = x^3$



Remembering we read a graph from left to right, describe the rate of change for the function above

A	B	C	D
Increasing at an increased rate	Increasing at a decreased rate	Decreasing at an increased rate	Decreasing at a decreased rate

3) Use the properties of exponents to write each expression simplest form:

a) Simplify  $(-2xy^7)(8x^2y^4)$

$$-16x^3y^{11}$$

Final answer for a

$$-16x^3y^{11}$$

b) Simplify  $9(2x^4)^3$

$$9 \cdot 2^3 x^{12}$$

$$72x^{12}$$

Final answer for b

$$72x^{12}$$

c) Reduce  $\frac{x^{12}y^{14}}{x^{-2}y^6z^2}$

$$\frac{x^{14}}{y^8z^2}$$

Final answer for c

$$\frac{x^{14}}{y^8z^2}$$

4) Re-Write as a logarithm

$$2^x = 32$$

Final answer here

$$\log_2 32 = x$$

5) Re-write the equation  $\log_6 36 = 2$  in exponent form

Final answer here

$$6^2 = 36$$

8) Jennifer bought a new TV for \$1,500. The value of this TV will decrease about 17% each year. About how long will it take for the value of the TV to be reduced to \$590?

A	B	C	D
About 1 year	About 2 years	About 5 years	About 8 years

$$y = 1500(1 - .17)^x$$

$$590 = 1500(.83)^x$$

$$\log_{.83} \left( \frac{590}{1500} \right)$$

9) Re-write the radical expression  $\sqrt[2]{x^9}$  with a rational exponent

Write your final answer here:

$$x^{\frac{9}{2}}$$

10) Re-write the expression  $g^{\frac{3}{8}}$  using a radical sign

Write your final answer here:

$$\sqrt[8]{g^3}$$

11) Write the expression  $\log_4 64 - (2 \log_4 2 + \log_4 16)$

$$\log_4 64 - \log_4 4 \cdot 16$$

$$\log_4 64 \quad \log_4 \left(\frac{64}{64}\right)$$

11) Write your final answer here

$$\log_4 1 \quad \text{or} \quad 0$$

Solve the following Exponential Equations:

12)  $2^{3x} = 16^{x-4}$

$$2^{3x} = 2^{4(x-4)}$$

$$2^{3x} = 2^{4x-16}$$

$$3x = 4x - 16$$

$$16 = x$$

12)

$$x = 16$$

13)  $28 + 3^x = 1906$

$$3^x = 1878$$

$$\log_3 1878$$

13)

$$6.86$$

14)  $2 \ln x = 3$  Remember that we can re-write this problem to  $2 \log_e x = 3$  And then we should know that  $x^2 = e^3$ , using our calculator we get 4.48

Now you do....

15)  $6 \ln x = 10$

$$\ln x = \frac{10}{6}$$

$$e^{\frac{10}{6}} = x$$

15)

$$5.29$$

16)  $4 \ln x = 6$

$$\ln x = \frac{6}{4}$$

$$e^{\frac{6}{4}} = x$$

16)

$$4.48$$

17)  $3^{8x} = 81^{3x-2}$

$$3^{8x} = 3^{4(3x-2)}$$

$$8x = 12x - 8$$

$$8 = 4x$$

17)

$$x = 2$$

$$y = a \cdot U_0 r^x + k$$

horizontal asymptote

**KEY POINT: ALL Exponential Functions have horizontal Asymptotes!**

State the horizontal asymptote of the following:

18)  $y = 2 + 3^x$

19)  $y = 2^x$

18)  $y = 2$

19)  $y = 0$

**I know my Log Rules:**

20)  $\log_2 \frac{18}{2} = \log_2 ? - \log_2 ?$

$\log_2 18 - \log_2 2$

20) 18 and 2

21)  $2 \log_3 6 = \log_3 6^?$

(2) (2)

22)  $\log_2 \left(\frac{x+5}{2}\right) = \log_2 5 + \log_2 2$  What is the value of x that makes this true?

$\frac{x+5}{2} = 10$

$x = 15$

**I can re-write expressions:**

23) Re-Write the radical expression  $\sqrt[3]{x^2}$  as a rational expression. No radical signs

$x^{\frac{2}{3}}$

24) Re-write the expression  $W^{\frac{2}{9}}$  as an expression with a radical sign.

$\sqrt[9]{W^2}$

25) Write the equation of the curve that in the form  $y = U_0 \cdot r^x$  given that it passes through the points.

(4,324) and (6,2916)

$324 r^2 = 2916$   
 $r^2 = 9$

$y = U_0 \cdot r^x$   
 $324 = U_0 \cdot 3^4$   
 $4 = U_0$

so  $U_0 = 4$

$r = 3$   
 $y = 4 \cdot 3^x$