Advanced Algebra Assignment #18

Unit 3: Exponential, Power and Log Function Review #1

1) The volume of a room can be described by the following dimensions: Width=x Length =2x and the height =.5x

What family of functions best models the relationship between the height and the volume? $(2x^2)(.5x)$

$1x^3$

So multiply it out to make a function V= x^3

A	B	C	D
Exponential	Linear	Power	Logarithmic

Key point: A power function has x as the base!

2) The area of a rectangle with a width of x and a length of 2x can be represented by the function A=(2x)x. What family of functions best models the relationship between the area and width of the rectangle.

What is the function multiplied out $2x^2$

A	B	C	D
Exponential	Linear	Power	Logarithmic

Key point: A power function has x as the base!

3) A person deposits $400 into an account that earns 7%APR. The function can be represented by $y=400(1+.07)^x$.

What family of functions best models the relationship between time and the total amount of money in the account?

A	B	C	D
Exponential	Linear	Power	Logarithmic

Key point: An exponential function has x as the exponent!!!

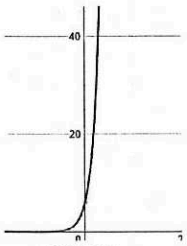
$y = -20x + 1000$

4) You spend $20 each week. You started with $1,000 in your bank account. What family of functions best models the relationship between time and the total amount in your bank account.

A	B	C	D
Exponential	Linear	Power	Logarithmic

5) How would you describe the rate of change for the following graph?

Describe the rate of change(slope) of the function below. This is a multiple choice answer.



A	B	C	D
Increasing at a Increasing rate	Increasing at a decreasing Rate	Decreasing at a increasing rate	Decreasing at a decreasing rate

6) Simplify the following:

a) $(-12xy^8)(4x^2y^3)$

6a)Final answer

$-48x^3y^{11}$

b) $12(4j^2)^4$

$12 \cdot 256j^8$

6b)Final answer

$3072j^8$

c) $\frac{x^{12}y^{20}}{x^4y^{12}z}$

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

6c) Final answer

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

7) Re-write the following as a logarithim:

a) $2^x=64$

7a)

$\log_2 64 = x$

b) $5^x=125$

7b)

$\log_5 125 = x$

Re-Write as an exponential

c) $\log_5 \frac{1}{25}=-2$

7c)

$5^{-2} = \frac{1}{25}$

I can do exponential applications:

8) You buy a boat for $15,000 and it depreciates 2% per year. After how many years will the boat be worth 12,800?

Equation

$y = 15,000(1-.02)^x$

$12,800 = 15,000(.98)^x$

Final answer 7.85 years

$\log_{.98}\left(\frac{12,800}{15,000}\right)$

9) You deposit $10,000 into an account that earns 8% APR compounded monthly. How long will it take for the account to be worth $20,000?

Equation:

$y = 10,000\left(1+\frac{.08}{12}\right)^x$

$20,000 = 10,000\left(1+\frac{.08}{12}\right)^x$

Final answer

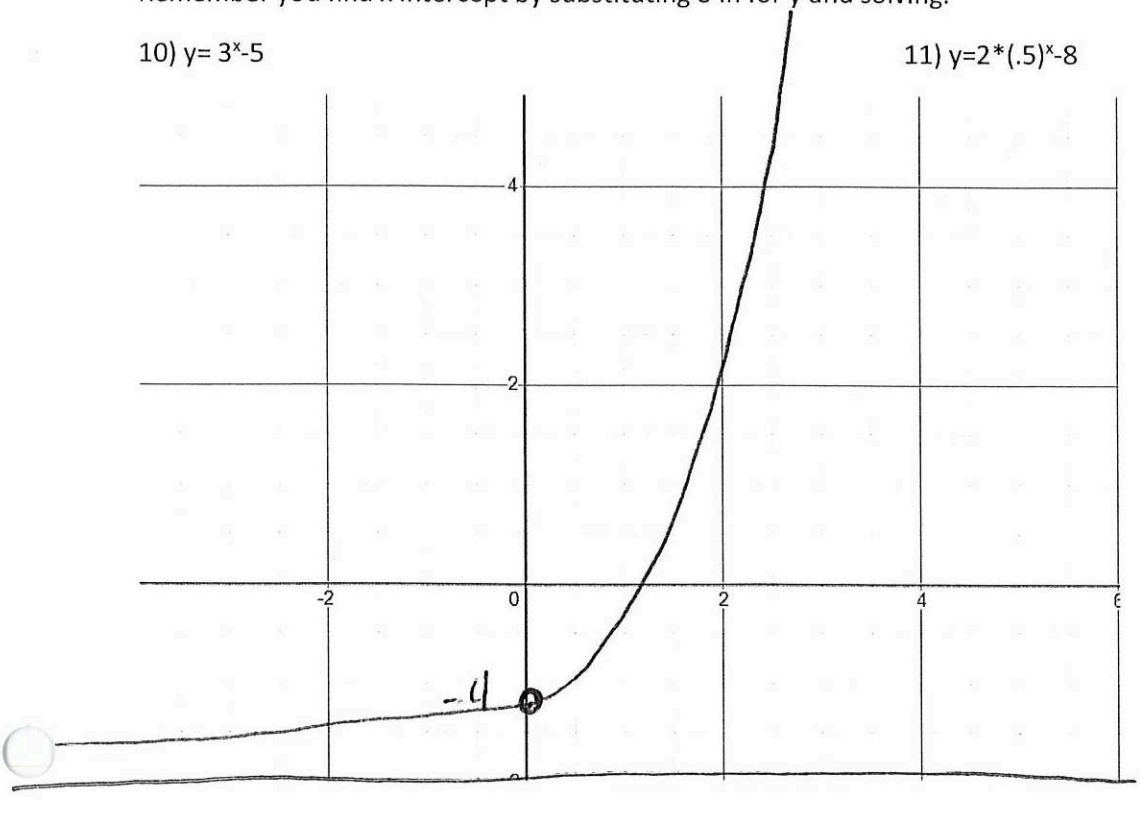
104 Months

8.69 years

I know that ALL exponential functions have horizontal asymptotes:

Identify the horizontal asymptote in the following equations, then find the x intercept (if any).
Remember you find x intercept by substituting 0 in for y and solving.

10) $y= 3^x-5$



Horizontal asymptote

$y=-5$

X intercept

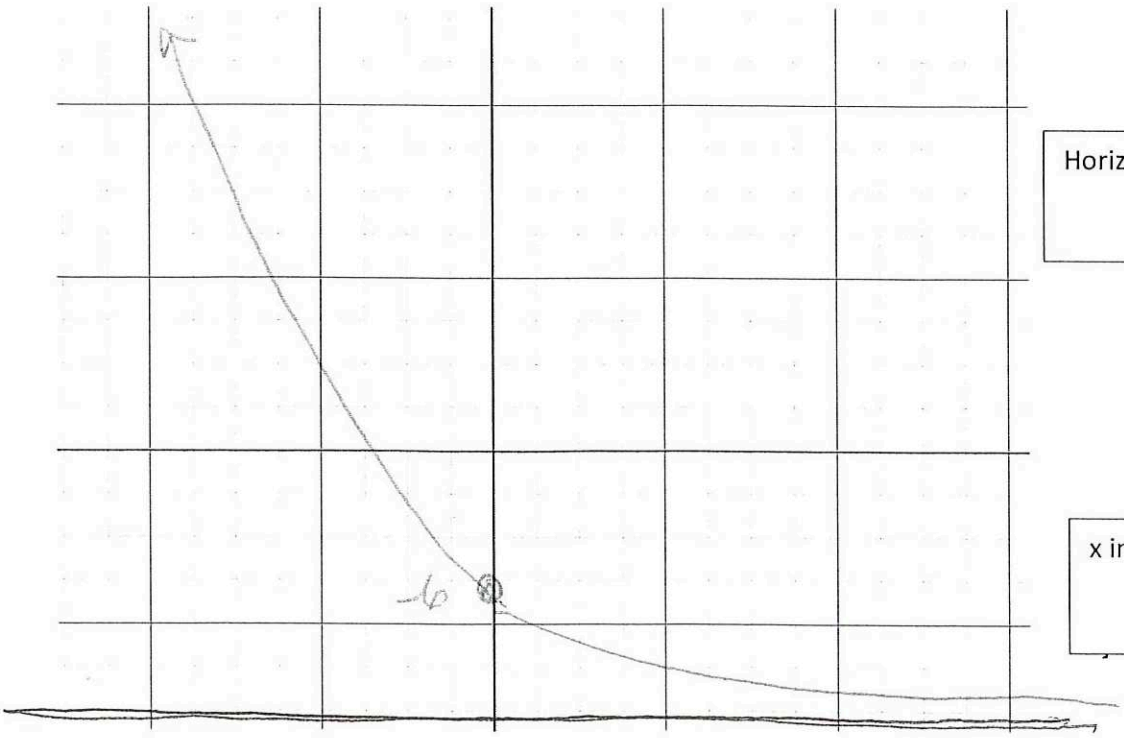
1.46

$3^x-5=0$

$3^x=5$

$\log_3 5=x$

11) $y=2*(.5)^x-8$



Horizontal asymptote

$y=-8$

x intercept

-2

$\frac{1}{2}^x=4$

$\log_{\frac{1}{2}} 4=x$

I can use Log rules to simplify expressions: Write the following as a single logarithm

12) $\log_4 16 - (\log_4 2 + \log_4 4)$

$\log_4 16 - \log_4 8 \quad \log_4 \left(\frac{16}{8}\right)$

Final answer

$\log_4 2$

13) $2\log_3 9 + \log_3 2$

$\log_3 81 + \log_3 2$

Final answer

$\log_3 162$

14) $2\log_3 12 - 2\log_3 4$

$\log_3 144 - \log_3 16$

$\log_3 \frac{144}{16}$

$\log_3 9$

Final answer

$\log_3 9$

15) I can write the equation of a curve in the form $y=U_0*r^x$

x	0	1	2	3	4	5	6	7
y	2	6	18	54	162			4374

$y = 2 \cdot 3^x$

$162r^3 = 4374$

$r^3 = 27$

$r = 3$

16) (4, 128) (7,8192)

$y = .5(4)^x$

$128r^3 = 8192$

$r^3 = 64$

$r = 4$

$y = U_0 \cdot r^x$

$128 = U_0 \cdot 4^4$

$U_0 = .5$

17) The height of an interesting creature in cm can be modeled by the function $h(x)= 105.2\sqrt[4]{t} +22.8$.

The t variable stands for the age in years of this interesting creature. Using this model, find the age of this very interesting creature whose height is 481.36cm.

This is one old interesting creature

$481.36 = 105.2t^{\frac{1}{4}} + 22.8$

$\left(\frac{458.56}{105.2}\right) = t^{\frac{1}{4}}$

$t = 361$

361 years old wow!

18) Solve the equation $10\ln x=6$

$10\log_e x = 6$

$e^6 = x^{10}$

$x = 1.82$

Remember $\ln x$ Means $\log_e x$

so $\log_e(x^{10}) = 6$

base, argument, exponent

19) $2\log_e x=12$

$e^{12} = x^2$

$x = 403$