## **Exponential Functions:**

Functions are exponential if they have a positive number with a variable in the exponent. State whether the following functions are exponential or not. Then state the parent function if it is exponential. Parent functions are just  $y = b^x$ , where you change b to be the base you are given.

Examples:

Ex 1:  $y = 3 * 6^x$  ... This is exponential, since it has  $6^x$ . A positive number, raised to a variable exponent. Parent function:  $v = 6^x$ 

Ex 2:  $y = 81x^3 - 2$  ... This is <u>not</u> exponential, since the <u>variable (x) is not in the exponent</u>.

Ex 3:  $y = 4 * (-2)^x$  ... This is not exponential, since the number being raised to the exponent is Negative.

Ex 4:  $y = 6 * 2^{x-1} + 1$  ... This is exponential. There is a positive number raised to a variable exponent. Parent function:  $y = 2^x$ 

1. 
$$y = 32^x$$

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 2.  $y = 91x^3$ 

$$3. y = \log x$$

3. 
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 4.  $y = 5 * 2^x$ 

5. 
$$y = (-26)^x + 1$$

$$6. y = 82 * 7^{x+9}$$

7. 
$$y = 324x^{-1}$$

5. 
$$y = (-26)^x + 1$$
 6.  $y = 82 * 7^{x+9}$  7.  $y = 324x^{-1}$  8.  $y = 73 * 4^{-x} + 9$ 

9. 
$$y = 11^x - 45$$

10. 
$$y = 57 * 4x^2$$

11. 
$$y = 7^x + 8$$

9. 
$$y = 11^x - 45$$
 10.  $y = 57 * 4x^2$  11.  $y = 7^x + 8$  12.  $y = -7 * 71^{-x} + 1$ 

13. 
$$y = 14^{2x}$$

14. 
$$y = 8 *$$

15. 
$$y = 20 * x^x$$

13. 
$$y = 14^{2x}$$
 14.  $y = 8 *$  15.  $y = 20 * x^x$  16.  $y = -3 * 93^4$ 

17. 
$$y = 32 * -3^3$$

18. 
$$y = -5 * 9^{-x+1}$$

17. 
$$y = 32 * -3^x$$
 18.  $y = -5 * 9^{-x+1}$  19.  $y = -2 * (-8)^x$ 

State the transformations of the following exponential functions. Standard form:  $y = a * b^{x-h} + k$ 

Examples:

Ex 1:  $y = -2^x + 6$  ... Reflects about x-axis (because of the negative sign), up 6 (because of +6)

Ex 2:  $f(x) = 4 * 2^{x+3}$  ... Vertical Stretch by factor of 4 (Because of the 4), Left 3 (because of x+3)

Ex 3:  $g(x) = \frac{1}{2} * 5^{x-41} - 23$  ... Vertical Shrink by factor of ½ (because of the 1/2 )Right 41 units (because of x - 41). Down 23 units (because of -23)

20. 
$$f(x) = -3 * 12^{x-1}$$

Transformation:

21. 
$$y = 6^x - 7$$

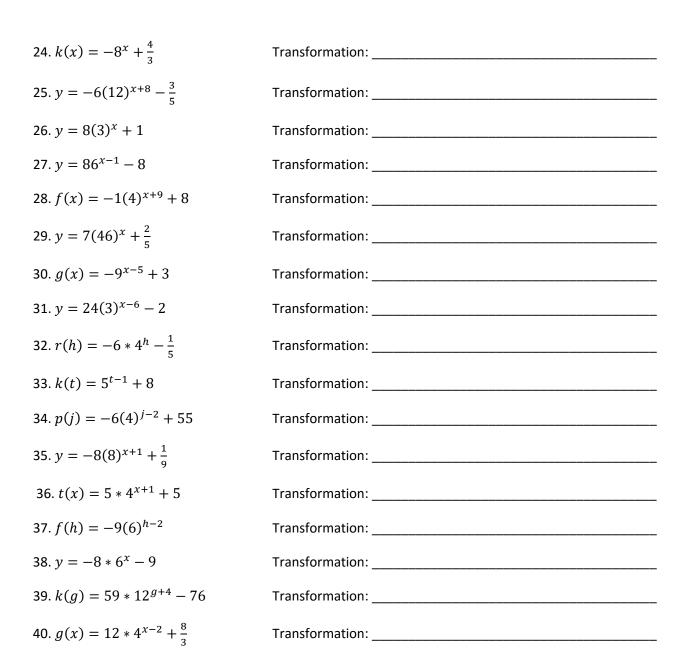
Transformation:

22. 
$$g(x) = -3(6)^{x+4} - 16$$

Transformation:

23. 
$$y = 9 * 63^{x-2}$$

Transformation: \_\_\_\_\_



Ask Questions if you need help with this!