

Algebra 2 – 8.1 WS Exponential Functions & Transformations

Name: _____ Hour: _____

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: $y = 6^x$

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

Ex 3: $y = 4 * (-2)^x$... This is not exponential, since the 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: $y = 2^x$

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| 1. $y = 32^x$ | 2. $y = 91x^3$ | 3. $y = \log x$ | 4. $y = 5 * 2^x$ |
| 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. $y = 7^x + 8$ | 12. $y = -7 * 71^{-x} + 1$ |
| 13. $y = 14^{2x}$ | 14. $y = 8 *$ | 15. $y = 20 * x^x$ | 16. $y = -3 * 93^4$ |
| 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 $\frac{1}{2}$ (because of the $\frac{1}{2}$) 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: _____

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| 24. $k(x) = -8^x + \frac{4}{3}$ | Transformation: _____ |
| 25. $y = -6(12)^{x+8} - \frac{3}{5}$ | Transformation: _____ |
| 26. $y = 8(3)^x + 1$ | Transformation: _____ |
| 27. $y = 86^{x-1} - 8$ | Transformation: _____ |
| 28. $f(x) = -1(4)^{x+9} + 8$ | Transformation: _____ |
| 29. $y = 7(46)^x + \frac{2}{5}$ | Transformation: _____ |
| 30. $g(x) = -9^{x-5} + 3$ | Transformation: _____ |
| 31. $y = 24(3)^{x-6} - 2$ | Transformation: _____ |
| 32. $r(h) = -6 * 4^h - \frac{1}{5}$ | Transformation: _____ |
| 33. $k(t) = 5^{t-1} + 8$ | Transformation: _____ |
| 34. $p(j) = -6(4)^{j-2} + 55$ | Transformation: _____ |
| 35. $y = -8(8)^{x+1} + \frac{1}{9}$ | Transformation: _____ |
| 36. $t(x) = 5 * 4^{x+1} + 5$ | Transformation: _____ |
| 37. $f(h) = -9(6)^{h-2}$ | Transformation: _____ |
| 38. $y = -8 * 6^x - 9$ | Transformation: _____ |
| 39. $k(g) = 59 * 12^{g+4} - 76$ | Transformation: _____ |
| 40. $g(x) = 12 * 4^{x-2} + \frac{8}{3}$ | Transformation: _____ |

Ask Questions if you need help with this!