/K	/A	/C	/T	Total /

Name: _____ Date: _____

MCR3U Diagnostic quiz: Exponential functions

1. Evaluate each expression. Show your work and write your answers as fractions in lowest terms.

a) $\left(\frac{1}{27}\right)^{\frac{4}{3}}$

b) $3^{-2}+5^{-1}+7^{0}$

2. Simplify each expression. Write your answers using only positive exponents.

a) $(2x)^{4}(3x)^{-1}$

b) $\frac{4(3x)^{2}}{2x^{5}}$

3. Explain how $8^{\frac{1}{3}}$ is different from 8^{-3}.

4. Explain why ONE of the following statements is incorrect:

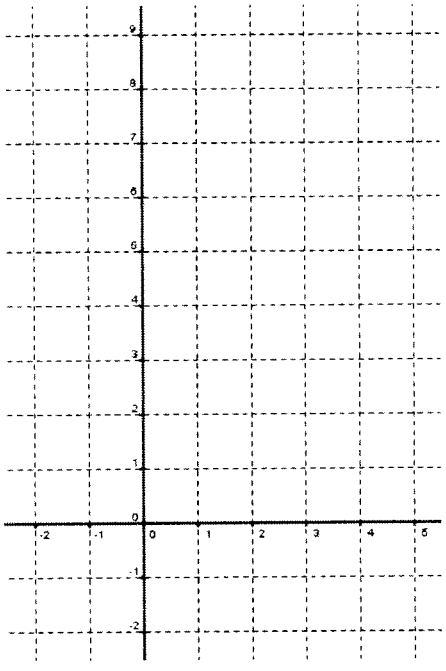
a) $4^3 + 4^{-1} = 4^2$ b) $5^x 5^x = 25^{2x}$ c) $8(4^x) = 32^x$

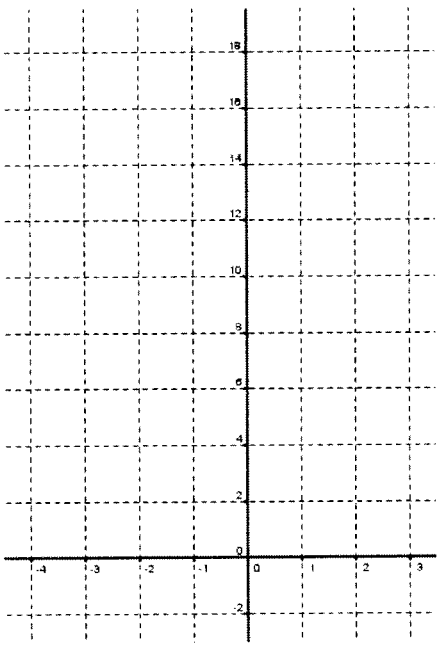
5. Write an equation for the exponential function that results from each set of transformations applied to the base graph $y = 10^x$.

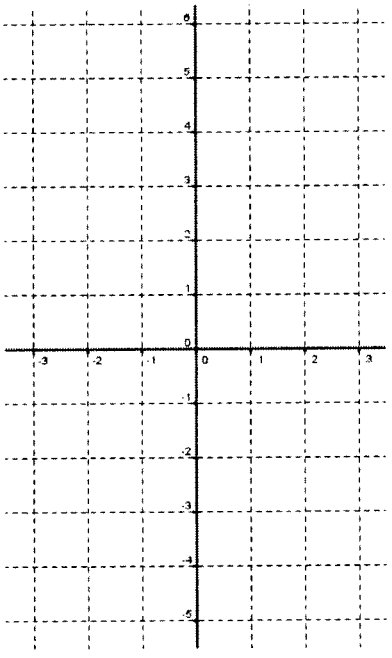
a) shifted right 4 units and reflected horizontally b) compressed vertically by ¼ and shifted up 3

6. Graph the following exponential functions. Mark all points accurately within the domain provided.

a) $y = 8 - 3^x$ b) $y = 4^{x+3} + 2$ c) $y = 2^x - 4$

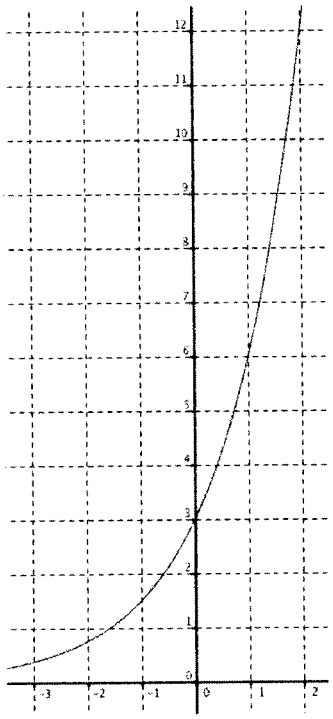






7. Write an equation for each of the following exponential functions.

a)



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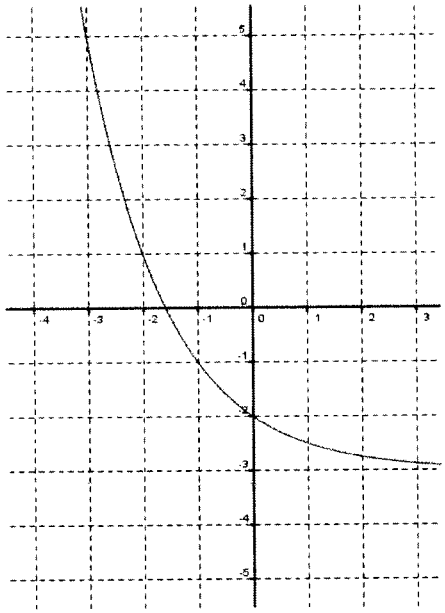
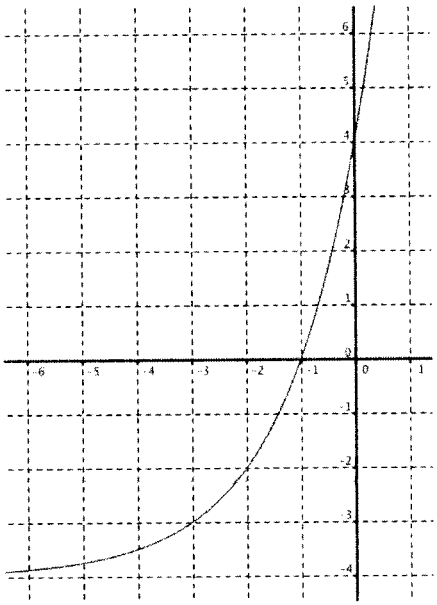


c)



8. Earlier today, Gillian bought a Mercedes CLK, fully-loaded, for $270 000. It is expected to depreciate in value by 20% per year. If she decides to sell it 10 years from now, how much will it be worth?

9. Ryan puts $15 000 into a Tax-Free Savings Account (TFSA) that pays 6% per year (compounded monthly), and never touches it again. Assuming that he's 16 now, how much will the account be worth when he uses it at age 65?

10. Cerium-143 has a half-life of 33 hours. What mass of a 40 mg sample remains after 4 days?