

/27K	/10A	/8C	/9T	Total	/54
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Name: _____ Date: _____

MCR3U

Test: Exponential functions

/7
K

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

a) $(81)^{\frac{1}{4}}$

b) $2^{-1} + 3^{-2}$

c) $\left(\frac{-8}{27}\right)^{-\frac{2}{3}}$

/7
K

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

a) $(x^6 y^3)^{\frac{1}{3}}$

b) $5(4x)^2(2x^3)^{-1}$

c) $x^3 \div x^{\frac{1}{2}}$

/2
C

3. Explain how $9^{\frac{1}{2}}$ is different from 9^{-2} .

/2
C

4. Explain why the following statements is incorrect: $2^3 - 2^{-1} = 2^4$

/2
C

5. Which statement is true? Justify your answer. $8(2^x) = 2^{x+3}$ $8(2^x) = 16^x$ $8(2^x) = 2^{4x}$

/2
C

5. Is the graph of $y = \left(\frac{1}{2}\right)2^{x-3}$ the same as the graph of $y = 2^{x-4}$? Justify your answer.

/4
K

5. Write an equation for the exponential function that results when the base graph $y = 5^x$ is

a) shifted right 3 units
and vertically reflected

b) horizontally stretched by a factor of 4
and shifted down 1 unit

/5
K

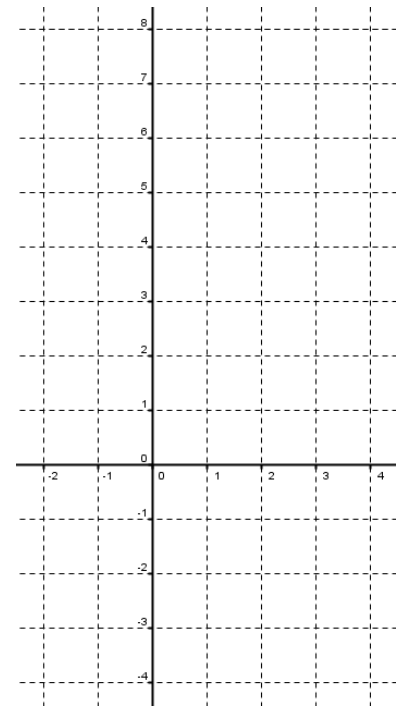
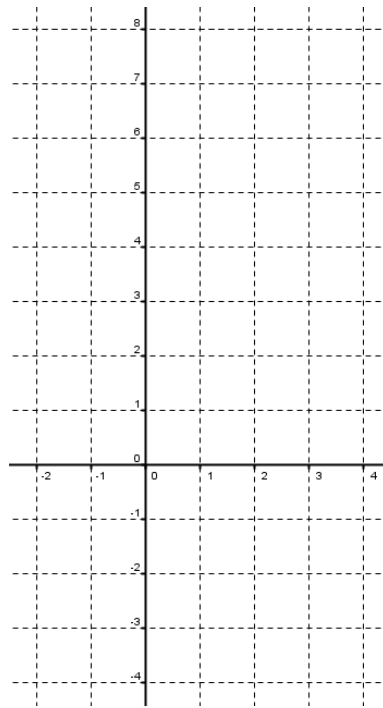
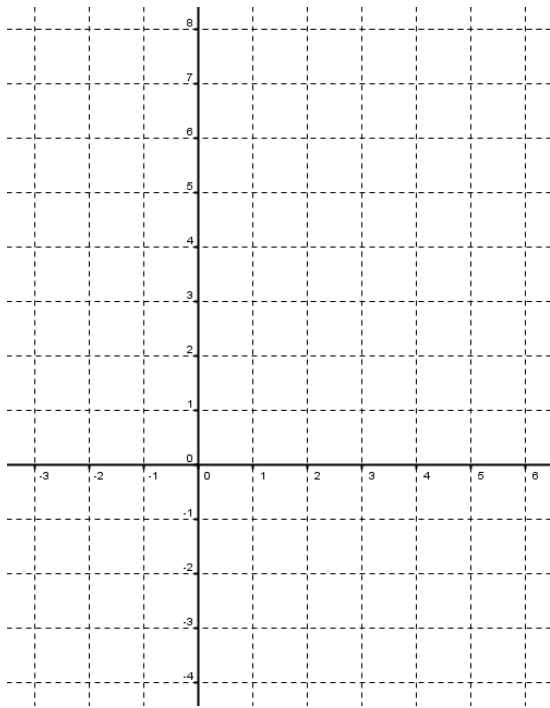
6. Graph the following exponential functions. Mark all points accurately within the domain provided.

a) $y = 2^{x-3}$

b) $y = 5 - 3^x$

c) $y = \frac{1}{2}(3)^x - 4$

/2
T



/4
T

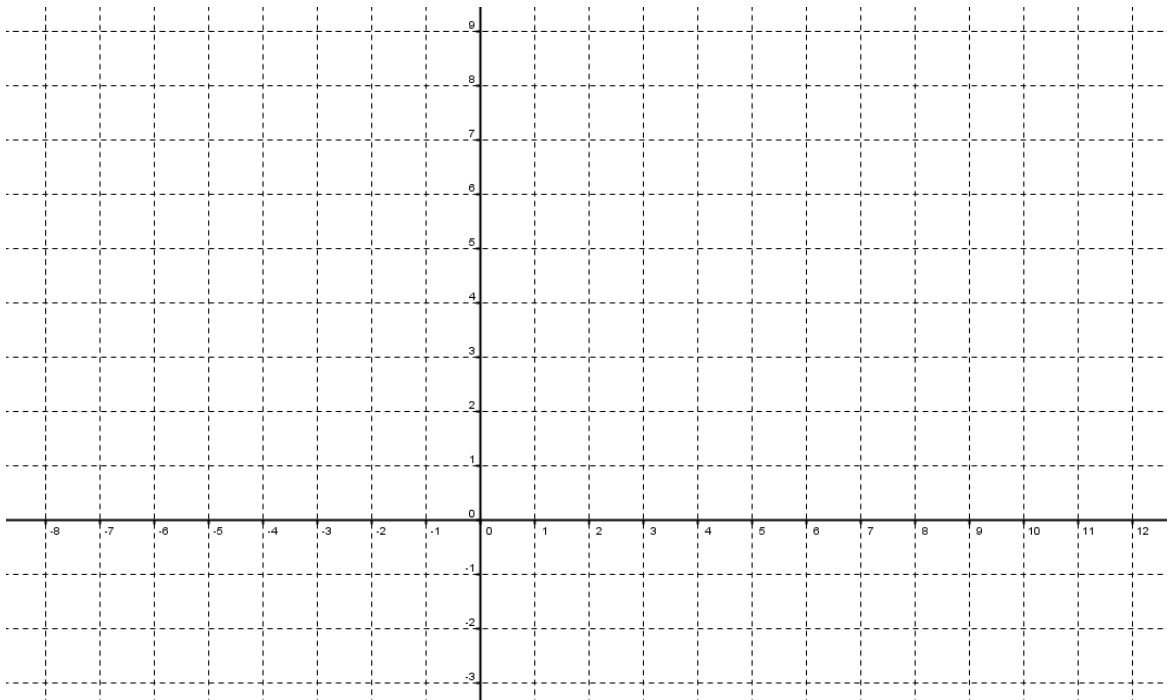
7. Graph ONE of the following exponential functions by applying transformations to the base graph $y = 2^x$.

Show at least one intermediate transformation.

$$f(x) = 3(2)^{5-x}$$

or

$$g(x) = (2)^{\frac{x+1}{4}} - 3$$



/4
K

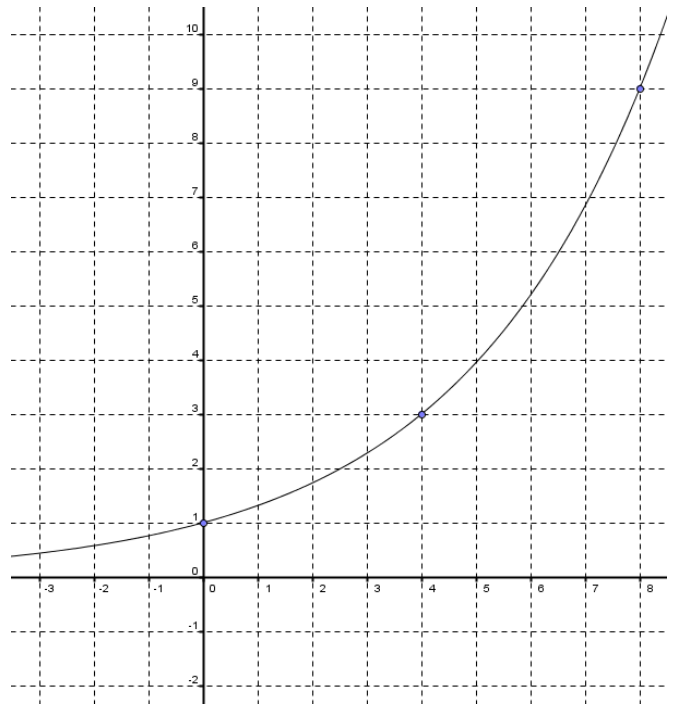
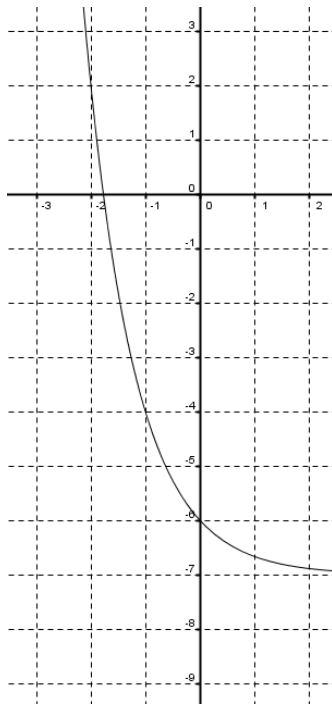
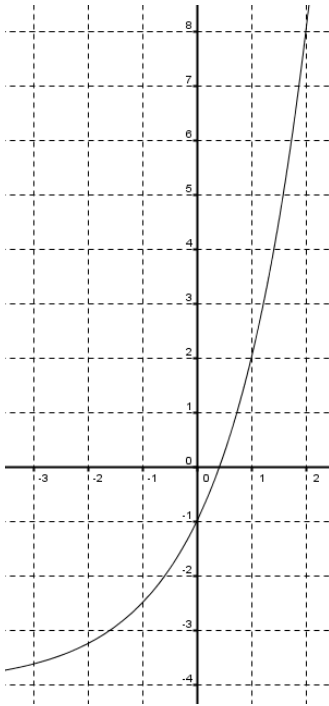
7. Write equations for each of the following exponential functions.

a)

b)

c)

/3
T



/3
A

8. Calculate the value of a Porsche 911 Turbo after 5 years if it sells initially for \$159 400 then depreciates at a rate of 18% per year.

► 911 Turbo



Engine

368 kW (500 hp) at 6,000 rpm

Performance*

Top Track Speed: 312 kph

0-100 kph: 3.7 s

\$ 159,400.00

/4
A

9. A young entrepreneur deposits \$5000 into an account that offers 3.65% interest, compounded daily, for 90 days. Calculate the amount of interest earned by this investment.

/3
A

10. Platinum-197 is a radioactive isotope with a half-life of 20 hours. Determine the amount of platinum-197 remaining in a 300 mg sample after 1 week.