

MCR3U Test # 3 Exponential Functions

Name: _____

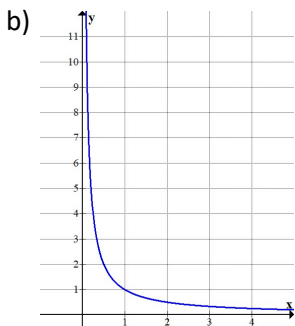
Content	Comm	Total
$\overline{50}$	$\overline{5}$	$\overline{55}$

Show all work for full marks.

1. Are the following exponential functions (indicate yes/no)?

If exponential, indicate growth or decay. [5]

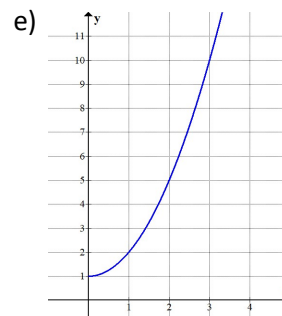
a) $f(x) = x^3$



c)

x	y
0	250
1	300
2	360
3	432

d) $f(x) = 2^{-x}$



2. What is the equation of the exponential function with horizontal asymptote $y = 2$, y-intercept = 10 and a common ratio of 3? [1]

3. Fill in the blanks. [4]

a) Range of $f(x) = 2^{3x} - 3$ _____

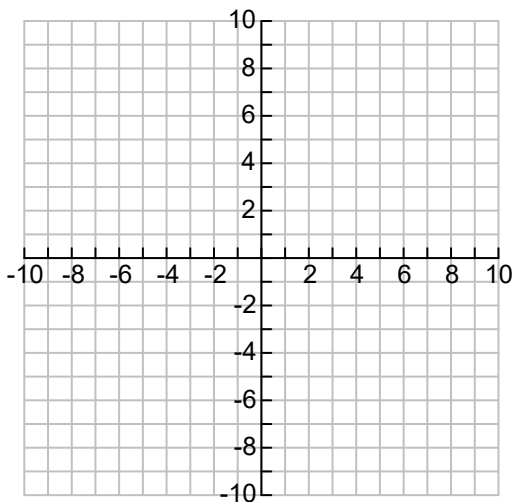
c) Asymptote of $f(x) = (\frac{1}{2})^x + 3$ _____

b) Domain of $f(x) = 2^{3x} - 3$ _____

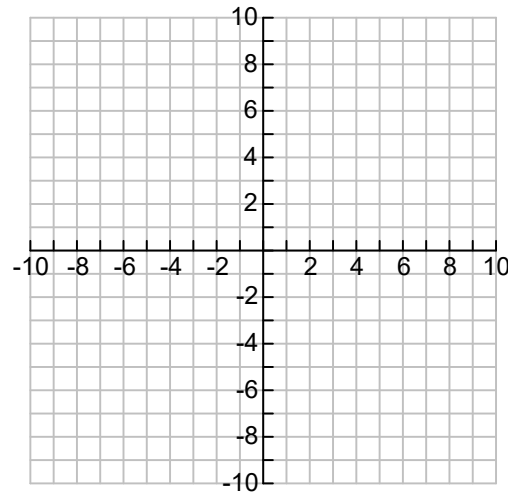
d) Y-intercept of $f(x) = 3(2)^{x+1}$ _____

4. State the transformations in order and graph each of the following. Label points as needed. [6]

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



b) $f(x) = -2^{2x-4} + 3$



6. Simplify/Evaluate. Express each answer with positive exponents. [11]

a) $\frac{24x^5y}{6x^4y^2}$

b) $\frac{\sqrt[3]{27x^6y^{12}}}{\sqrt[4]{x}}$

c) $\left(\frac{x^8}{4}\right)^{-\frac{3}{2}}$

d) $\frac{(2^{-3}x^5y^2)^{-4}}{64x^8y^{-3}}$

e) $\frac{3^{-2}-3^3}{3^{-4}}$

7. Solve. Show an algebraic solution using exponent rules. [11]

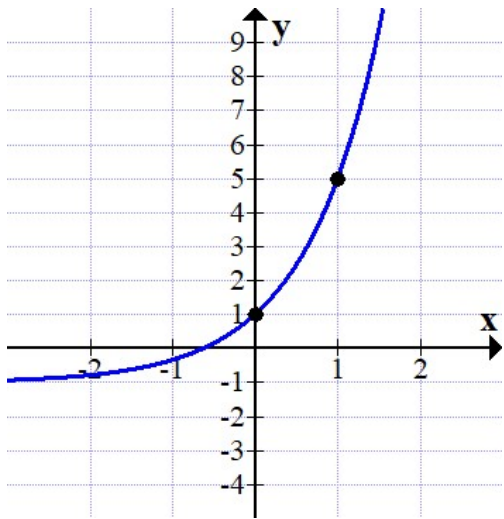
a) $2(3^{x-5}) = 54$

b) $5^{x+3} - 5^{x+2} = 12500$

c) $2^{2x^2-3x} = 32$

d) $x^{\frac{3}{2}} = 64$

8. [2] State the equation for the following graph:



Equation: _____

9. [2] State a different equation that produces the same graph as $f(x) = -3(2)^{x+2}$

Solve the following problems algebraically using techniques taught in class.

10. The population of Perth in 1996 was 1250.

Since 1996 the population has been growing at an average rate of 3% per year.

a) Determine an equation that represents the population of Perth. [2]

b) Use your equation to determine the Population of Perth in 2005. [1]

11. Thorium-227, with an initial mass of 80 mg has a half-life of 18.6 days.

Show an algebraic solution using exponent rules.

a) How much will be left after 2 weeks. [2]

Round to one decimal place.

b) Exactly how long until the sample decays to 10 mg? [3]