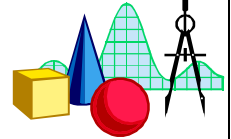




MATH DEPT. SOLUTION TO TUTORIAL 9

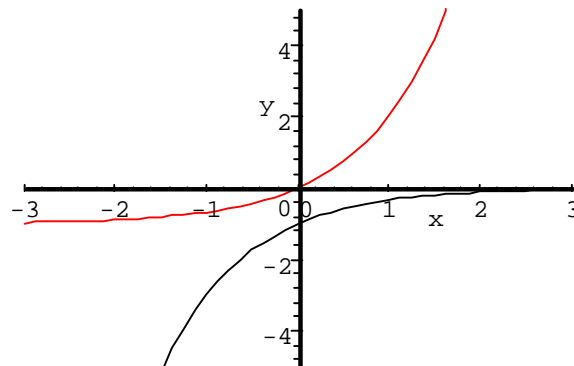
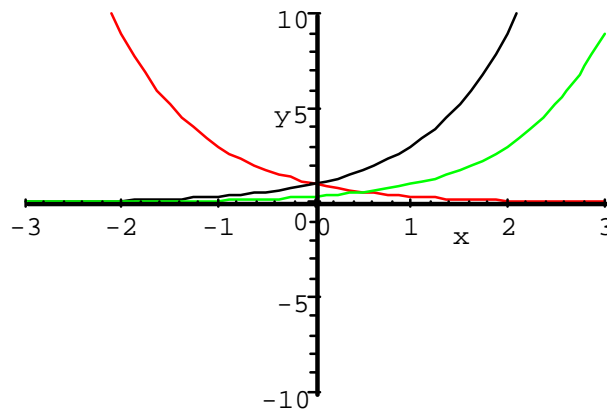


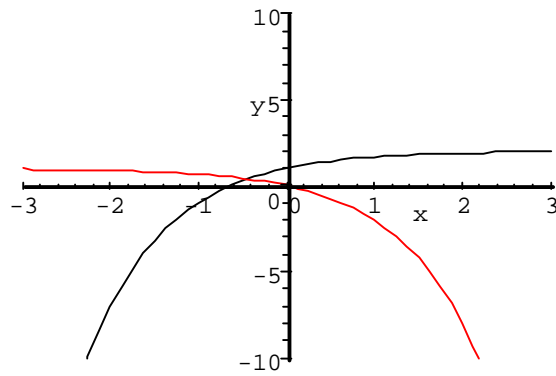
Solution 9: Exponential Functions: graphs, solution of equations, inverse.

1.
 - (a) $5^{2x} 5^{-x+2} = 5^{2x-x+2} = 5^{x+2}$
 - (b) $3^{-x} 3^{3x} = 3^{-x+3x} = 3^{2x}$
 - (c) $\frac{4^{5x}}{4^{2x}} = 4^{5x-2x} = 4^{3x}$
 - (d) $(4^{6x})^{1/2} = 4^{(6x)/2} = 4^{3x}$
 - (e) $(2^{3x})^{-1/3} = 2^{(3x)(-1/3)} = 2^{-x}$
 - (f) $\frac{(3^{4x})(3^{-2x})}{3^{-3x}} = 3^{4x-2x+3x} = 3^{5x}$

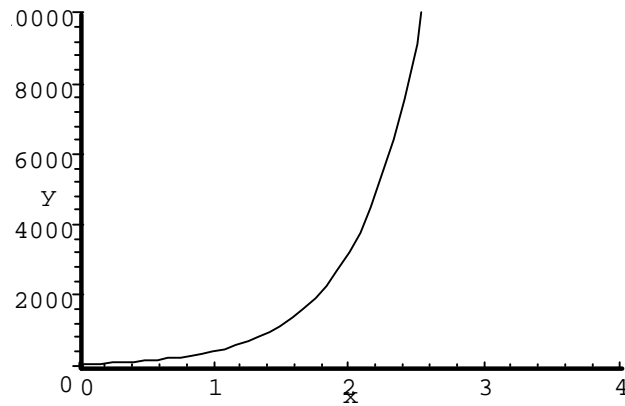
2.
 - (a) $x^2 2^x - 2^x = 0$ or $2^x(x^2 - 1) = 0$. Since $2^x > 0$ for all x , then $x^2 - 1 = 0$ or $x^2 = 1$, $x = \pm 1$.
 - (b) $3^x = 1/27 = 3^{-3}$. Thus $x = -3$
 - (c) $(1/3)^x = 81 = 3^4 = (1/3)^{-4}$. Thus $x = -4$
 - (d) $2^{-x} = 32 = 2^5$ Thus $-x = 5$ or $x = -5$.

- 3.





4. (a) Since $A = P(1+i)^n$ then we have that $A = 2000(1.06)^5 = \$ 2676.45$
 (b) $A = 2000(1.03)^{10} = \$ 2687.83$
5. (a) $A = X(2^{3t})$ where X is the initial count and t is in hours. then $3200 = X(2^6)$ or $64X = 3200$ or $X = 50$.
 (b) After 1 hour the count is $A = 50(2^3) = 400$
 (c) After 3 hours the count is $A = 50(2^9) = 25,600$
 (d)



6. Since $y = 4^x$ is a one to one function with domain \mathbb{R} and range \mathbb{R}^+ then this function does have an inverse whose domain is \mathbb{R}^+ and range \mathbb{R} .

