Friday, April 18 George Voutsadakis

Read each problem **very carefully** before starting to solve it. Each problem is worth 10 points. It is necessary to show **all** your work. Correct answers without explanations are worth 0 points. GOOD LUCK!!

1. A population p is initially 15 and increases every hour by 40%. Find an equation for the population p(t) as a function of time.

After how many hours will the population reach 150 individuals? Please give your answer in exact form.

2. Describe the transformations needed to get from $f(x) = (\frac{1}{3})^x$ to $g(x) = -2(\frac{1}{3})^{-x} + 3$.

$$y = (\frac{1}{3})^x \longrightarrow \tag{()}$$

$$\rightarrow$$
 ()

$$\rightarrow$$
 ()

$$\longrightarrow \quad y = -2(\frac{1}{3})^{-x} + 3 \quad (\qquad)$$

3. Find equations for each of the graphs shown below.



- 4. Solve the equations, showing all steps and giving exact answers.
 - (a) $7e^{3x} + 11 = 39.$

(b) $3\log(2x+48) + 17 = 23$.

- 5. Solve the equations, showing all steps and giving exact answers.
 - (a) $\log_2(x+1) + \log_2(x-1) = 3.$

(b) $3^{2x+1} = 5^{x+7}$.