MATH 1030; A GUIDE TO QUIZ VI

1) Solve
   a) $\log_8(2x) = 2$. Solution: $2x = 8^2$, thus $x = 32$.
   b) $3 \times 2^x = 96$. Solution: $2^x = 32$, so $x = 5$.

2) Find the point of intersection of lines $y = 2x - 1$ and $y = 3x - 4$.
   Solution: Solving $2x - 1 = 3x - 4$ gives $x = 3$. Substituting $x = 3$ in either of the two equations gives $y = 5$. So the point of intersection has coordinates $(3, 5)$.

3) Graph the line $2x + 3y = 6$.

4) The cost of leasing a car is $800 for a down payment plus $240 per month. How many months can you lease a car for $3680? Hint: express the cost of the lease as a function $y = ax + b$ where $x$ is the number of months.
   Solution: The cost function is $y = 240x + 800$. We need to solve $3680 = 240x + 800$. Subtracting 800 from both sides gives $2880 = 240x$. Dividing by 240 gives $x = 12$.

5) If a (hyper) inflation is 60% per month, by what rate, in percentages, do the prices increase in one year? in one day?
   Solution: Prices increase by the factor $1.6$ every month. Hence by the factor $1.6^{12} \approx 281$ in 12 months. So the inflation rate is $280 = 28,000\%$. If $r$ is the daily rate, then $(1 + r)^{30} = 1.6$. This implies $1 + r \approx 1.015$, so the daily inflation rate is $0.015 = 1.5\%$.

6) Car A is on Utah/Nevada borderer and is driving 75 mph towards California. Car B is on California/Nevada border and is driving 65 mph towards Utah. Assume that the distance between the two borders is 420 miles.
   a) For each car express the distance $y$ to Utah/Nevada border in a form $y = ax + b$ where $x$ is the number of hours traveled. (In particular, if $x = 0$ then $y = 0$ for car A and $y = 420$ for car B.)
   b) At what time will the two cars meet? Find the distance from the Utah/Nevada border at that instant.
   Solution: a) $y = 75x$ for car A and $y = 420 - 65x$ for car B. b) $75x = 420 - 65x$ gives $140x = 420$, thus $x = 3$, after 3 hours. Cars are 225 from the Utah/Nevada border.