Problems

1. Solve and describe long term behaviour of a recurrence function defined by the following equation and initial condition:
   - $4y_t - 12y_{t-1} + 1 = 0$ and $y_0 = 1$
   - $4y_t - 12y_{t-1} + 1 = 0$ and $y_0 = 20$
   - $7(y_t - y_{t-1}) = 3$ and $y_0 = 1$
   - $4(y_t + y_{t-1}) = 2$ and $y_0 = 7$
   - $10(y_t + 2y_{t-1} - 30) = 0$ and $y_0 = 100$
2. 2007 exam, question 1(a) and look at 1(b) because that's what we're going to start with on Tuesday
3. Find present value P of the following:
   - \$2000 received 2 years from now given bank account with annual interest compounded with rate $r = 5\%$
   - \$400 received now given account with interest compounded continuously with rate $r = 0.1\%$
   - Salary of \$4500 received annually for 5 years given bank account with interest compounded continuously at rate $r = 1.5\%$
   - Amount M received at after n years given bank account with annually compounded interest with rate r.
   - Amount M received at after n years given bank account with continuously compounded interest with rate r.
   - Salary S received annually for n years given bank account with annually compounded interest with rate r.
   - Salary S received annually for n years given bank account with continuously compounded interest with rate r.
4. Find and describe the nature of stationary points of the following functions:
   - $y = 3x^4 + 8x^3$
   - $y = e^{x^3/10}$

- $p^D(q) = \dfrac{q^4}{100} + \dfrac{q^3}{40} + 10q - 150$
- $P(x) = -5x^4 - 100x^2 + 12$
- $V(t) = 300t^3 - 14t^2$
- $y(t) = (t+2)^4$
- $y = \dfrac{x^3 + 20x^2 + 100}{(x+1)^2}$
- $P(t) = (t^3 + 30t)e^{t^2/4}$

5. Find and describe the nature of stationary points of functions given by the recurrence equations from question 1.