10.03.2014, Question 1: We have the system of differential equations $x' = 3x - 2y$ and $y' = 4y^2 - 7x$. If we know that $x(0) = 2$ and $y(0) = 1$, estimate the value of $x$ and $y$ at $t = 0.1$.

(a) $x(0.1) = 4, y(0.1) = -10$
(b) $x(0.1) = 6, y(0.1) = -9$
(c) $x(0.1) = 2.4, y(0.1) = 0$
(d) $x(0.1) = 0.4, y(0.1) = -1$
(e) None of the above
10.03.2014, Question 2: TRUE or FALSE. The function $h(t)=4+3t$ is a linear combination of the functions $f(t)= 1+2t+t^2$ and $g(t)=2-t-t^2$.

(a) TRUE, and I am very confident.
(b) TRUE, but I am not very confident.
(c) FALSE, but I am not very confident.
(d) FALSE, and I am very confident.
10.03.2014, Question 3: Suppose $y_1(t)=\exp(2t)$.
For which of the functions will \{${y_1(t), y_2(t)}$\} be a linearly independent set?

(a) $y_2(t)=\exp(-2t)$.
(b) $y_2(t)=\exp(3t)$.
(c) $y_2(t)=1$.
(d) All of the above.
(e) None of the above.
10.03.2014, Question 4: Can the functions $y_1(t)=t$ and $y_2(t)=t^2$ be a linearly independent pair of solutions for an ODE of the form $y''+p(t)y'+q(t)y=0$ where $p(t)$ and $q(t)$ are continuous functions?

(a) YES, and I am very confident.
(b) YES, but I am not very confident.
(c) NO, but I am not very confident.
(d) NO, and I am very confident.