Math 141 Spring 2011 Test 1

Please show all your work in a readable, clean and ordered manner to receive full credits. Any unsupported work will be considered false and will receive no credits. **Put your final answer inside a box.**

(1) Given the function $f(x) = 2x^2 - 4x + 3$, compute the followings:
(a) $f(\frac{1}{2})$

(b) $\frac{f(a+h)-f(a)}{h}$

(c) Is f an injective function? Explain your answer clearly.

(2) Find the inverse of the function $f(x) = \frac{e^x - 1}{2e^x + 15}$

(3) Let $f(x) = \frac{x+4}{x+6}$, find $f^{-1}(-5)$

(4) Show that if f is even and g is odd then $f \circ g$ must be even

(5) Write the following quadratic in vertex-form by completing the square $f(x) = \sqrt{2}x^2 - 2x + \sqrt{3}$

(6) Solve the following quadratic equations
   (a) $3x^2 - 2x - 1 = 0$

   (b) $\sqrt{x^2 - 5x} = \sqrt{x - 8}$

   (c) $x^4 - 2x^2 = 0$ (be careful, this equation has 3 distinct solutions)

(7) Find the equation in (slope intercept form) of the line perpendicular to the line of equation $2x+y-2=0$ and passing through the point of coordinate $(1,1)$.

(8) How much pure water should be mixed with 5 liters of a 30% solution of sodium in order to obtain a mixture of 20% sodium. Show all your work and explain every step