MATH 100 MIDTERM

Write your name on your bluebook. Please show your work and give justifications for your answers. You may use your calculator and one side of an 8 1/2 by 11 sheet of notes on the midterm. You may not use a cell phone or computer. Try not to spend too much time on any single problem; if you get stuck on a problem leave a partial answer and move on to the next. If you have time left over at the end of the exam please use it to check your work.

(1) (10 pts) Evaluate $x^2 + 3x$ when $x = -8$.

(2) (10 pts) Simplify: $4(5y - 3) - (6y + 3)$.

(3) (10 pts) Simplify: $(49x^2y^4)^{-1/2}$.

(4) (10 pts) Simplify: $4(1 - t^2) + 2t(t + 1)$.

(5) (10 pts) Factor completely: $x^3 + 3x^2 + 2x$.

(6) Consider the rational equation $\dfrac{2}{x - 1} + 4 = \dfrac{14}{x - 1}$.
   a) (5 pts) What value or values of x make the denominator zero?
   b) (5 pts) Solve the equation for x.

(7) (10 pts) Solve for x: $2x^2 + 5x + 3 = 0$.

(8) (10 pts) Find the equation of the line connecting the points $(1, 4)$ and $(3, 7)$.

(9) The graph of the equation $y = 5x + 3$ is a line.
   a) (5 pts) Find the x- and y-intercepts of that line.
   b) (5 pts) Give the equation of the line perpendicular to that line that passes through the point $(5, 10)$.

(10) The graph of the function $f(x) = x^3 - 3x^2 + 2x$ is shown below.
   a) (5 pts) For approximately what value(s) of x does $f(x) = 1$?
   b) (5 pts) Is the function f even, odd or neither? Justify your answer.

Bonus (5 pts) Simplify:

$$\frac{\frac{1}{(x+h)^2} - \frac{1}{x^2}}{h}$$