Practice Exam Math 160

1. Do the following polynomial operations:
   (a) $(x^2 - 3x + 4) + (x^3 - x^2 + 3x + 1)$.
   (b) $(2x - 1)(x^2 + 7)$.
   (c) $x^2 + 4(x - 5) - 12(x + 8)$.
2. Factor the following polynomials:
   (a) $x^2 + 4x + 4$.
   (b) $x^4 - 4x^2 + 4$.
   (c) $3x^2 - 8x + 4$.
3. Solve the following equations:
   (a) $4 + (7x - 1) = 12x - 8$.
   (b) $2x^2 - 6x = 0$.
   (c) $\dfrac{3}{x+1} = 2x - 6$.
4. Find the equation of the line that passes through $(1, 3)$ and $(7, 12)$ and answer the following questions:
   (a) What is the y-intercept of the line?
   (b) What is the x-intercept of the line?
   (c) Is it parallel to the line $y = \frac{3}{2}x + 1$?
5. Solve the following inequalities:
   (a) $2x - 3 > 8$.
   (b) $|2x - 1| > 4$.
   (c) $\dfrac{2x-1}{3x+4} < 5$.
6. The income tax in Mathland is determined by the following function:

$$T(x) = \begin{cases} 0.25x & \text{if } 0 \le x \le 16000 \\ 4000 + .5(x - 16000) & \text{if } 16000 \le x \le 50000 \\ 21000 + .75(x - 50000) & \text{if } x > 50000. \end{cases}$$

   (a) How much taxes would a person that made 40000 in Mathland have to pay?
   (b) How much money did a person that paid 120000 in taxes make?