1. Find the equation of the plane tangent to the surface \( z e^{x-y^2} = 3 \) at the point \((2, 1, 3)\).
   Its \( z \)-intercept is:
   
   a. 3
   b. 3
   c. 15
   d. 15
   e. 0

2. Find the equation of the line perpendicular to the surface \( z e^{x-y^2} = 3 \) at the point \((2, 1, 3)\).
   It intersects the \( xy \)-plane at:
   
   a. \((7, 17, 0)\)
   b. \((-7, -17, 0)\)
   c. \((11, 19, 0)\)
   d. \((-11, -19, 0)\)
   e. \((11, 19, 6)\)
3. If the temperature in a room is given by \( T = 75 + xy^2z \) and a fly is located at \((2, 1, 3)\), in what unit vector direction should the fly fly in order to **decrease** the temperature as fast as possible?

   a. \( \langle 3, 12, 2 \rangle \)  
   b. \( \langle 3, -12, 2 \rangle \)  
   c. \( \langle -3, -12, -2 \rangle \)  
   d. \( \frac{1}{\sqrt{157}} \langle 3, 12, 2 \rangle \)  
   e. \( \frac{1}{\sqrt{157}} \langle -3, -12, -2 \rangle \)

4. Which of the following is NOT a critical point of \( f(x, y) = (2x - x^2)(4y - y^2) \)?

   a. \((0, 0)\)  
   b. \((0, 4)\)  
   c. \((1, 2)\)  
   d. \((2, 0)\)  
   e. \((-2, 4)\)

5. Find 3 numbers \( a, b \) and \( c \) whose sum is 80 for which \( ab + 2bc + 3ac \) is a maximum.

   Solve on the back of the Scantron.