Secant Line Approximation to Tangent

GROUP MEMBERS:
1. _____________________________
2. ______________________________
3. ______________________________
4. ______________________________

Goal: Determine the slope of the tangent line to the curve \( y = f(x) = x^2 \) that goes through the point P(2,4).

Instructions:
a. Each person will calculate the slope of one particular secant line using the attached sheets. The first point in the secant line is always (2, 4). Each person will have their own value for the second point \((x_2, y_2)\), as given in the table below.
b. After people have done their individual work, explain your work to each other and put your results in the table.

c. Group Answer. As the value of \( x_2 \) gets closer and closer to 2, what does the value of the slope of the secant line approach?

d. The tangent line is the line through the point P(2,4) that has the above value for the slope. Write the equation of the tangent line (using the slope-point formula for a line).
Study the slope of the secant line to the graph of the function $y = f(x) = x^2$ that goes through two points.

The initial point is (2, 4).

My second point is: $x_2 = \underline{\hspace{2cm}}$, $y_2 = \underline{\hspace{2cm}}$

i. On the below graph, plot your two points. Your graph does not have to be drawn to scale. Then draw the secant line that goes through the two points.

ii. Calculate the slope of this secant line. Write out the steps in your calculation.