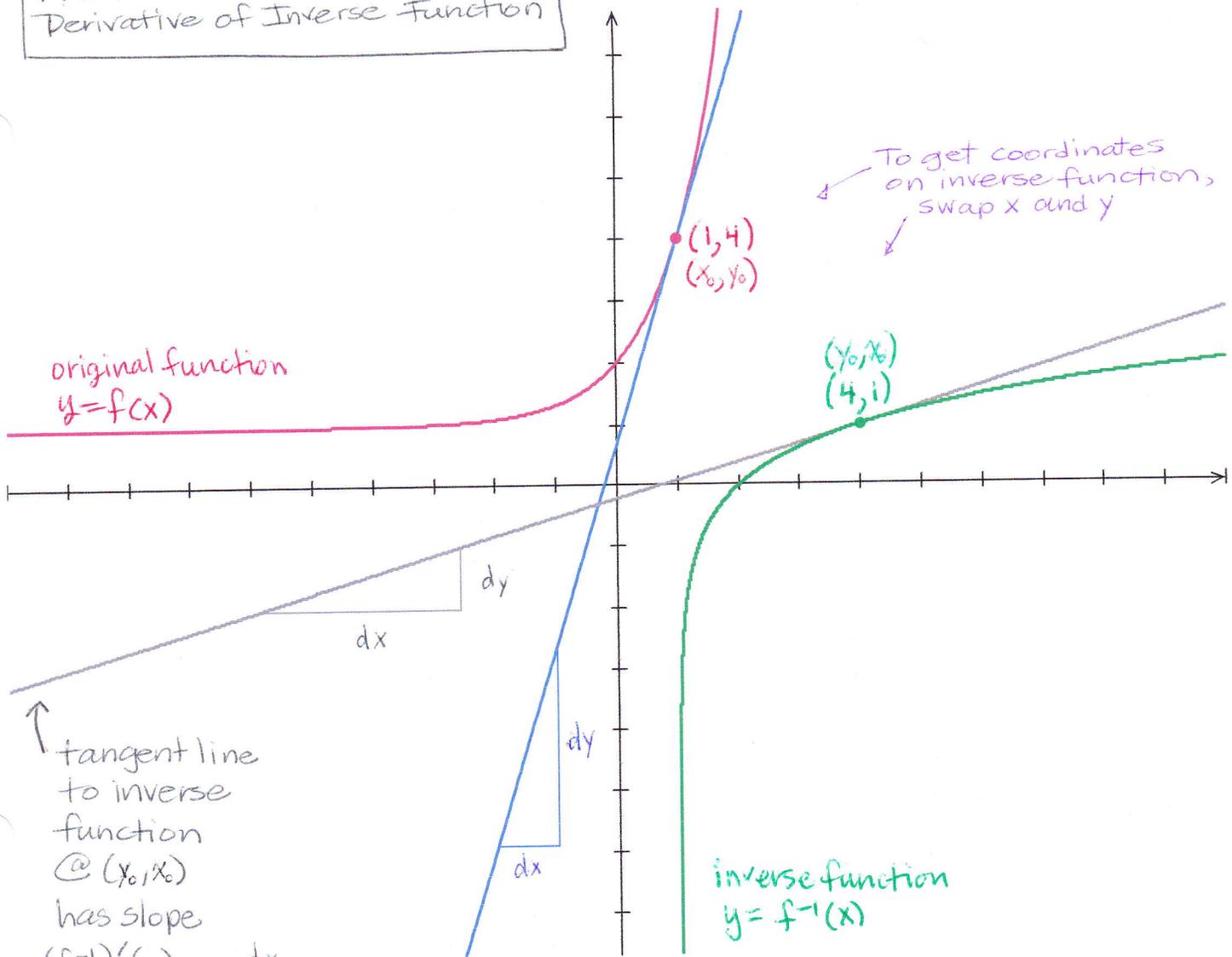


Math 250
Derivative of Inverse Function



To get coordinates on inverse function, swap x and y

original function
 $y=f(x)$

(y_0, x_0)
 $(4, 1)$

inverse function
 $y=f^{-1}(x)$

tangent line to inverse function @ (y_0, x_0) has slope $(f^{-1})'(y_0) = \frac{dx}{dy}$

tangent line to original function @ (x_0, y_0) has slope

$$m = \frac{dy}{dx} = f'(x_0)$$

To get slope of tangent line, take reciprocal.

$$(f^{-1})'(y_0) = \frac{1}{f'(x_0)} = \frac{1}{f'(f^{-1}(y_0))}$$

CAUTION y_0 is the x-coordinate of point (y_0, x_0) on graph of inverse but x_0 is the x-coordinate of point (x_0, y_0) on graph of function.

$$f(x_0) = y_0 \quad \text{or} \quad x_0 = f^{-1}(y_0)$$