Quiz 3
Math 180 Section 102

Name: Solutions
ID: __________

Workshop Section? Circle one: 
Tuesday Wednesday Thursday Friday in Math 104 Friday in Math 204

Answer the following questions. Work individually. No electronic devices or notes are permitted.

1. Find the two $x$ values at which the tangent line to the curve $y = \frac{x+3}{x+2}$ is perpendicular to the line $y = x$.

   \[ y' = \frac{(x+2) \cdot 1 - (x+3) \cdot 1}{(x+2)^2} = \frac{x+2 - x - 3}{(x+2)^2} = \frac{-1}{(x+2)^2} \]

   Set $y' = -1$ (so that it is perpendicular to $y = x$):

   \[-1 = \frac{-1}{(x+2)^2} \Rightarrow (x+2)^2 = 1 \Rightarrow x^2 + 4x + 4 - 1 = 0 \]

   \[ \Rightarrow x^2 + 4x + 3 = 0 \]

   \[ \Rightarrow (x+3)(x+1) = 0 \]

   So the two $x$-values are $x = -3$ and $x = -1$.

2. Let $f(x) = (x - 11)(6x + 7)$. Find $f'(6)$.

   \[ f'(x) = (x-11) \cdot 6 + 1 \cdot (6x+7) \]

   So

   \[ f'(6) = (6-11) \cdot 6 + (6 \cdot 6 + 7) \]

   \[ = -5 \cdot 6 + 36 + 7 \]

   \[ = -30 + 36 + 7 = 13 \]