

Section 2.7: Additional Problems Solutions

1. We know that the tangent line touches the function at the point that it is tangent. This means that the y -value of that tangent line and the function, at the point of the tangent line, will be the same value. We also know that the slope of the tangent line is the instantaneous rate of change.

$$\text{Thus } f(3) = 4(3) + 5 = 17 \text{ and } f'(3) = 4.$$

2. We need the equation of the tangent line at $x = 4$. Since we were given two points, use them to find the equation of the line.

$$y - 1 = \frac{11-1}{6-4}(x - 4)$$

$$y - 1 = 5(x - 4)$$

$$y - 1 = 5x - 20$$

$$y = 5x - 19$$

$f(4) = 5(4) - 19 = 20 - 19 = 1$ If we noticed that one of the points was the point at $x = 4$ we could have just read off the y -value to get $f(4)$.

$$f'(4) = 5$$

3. We need the equation of the tangent line at $x = 2$. Since we were given two points, use them to find the equation of the line.

$$y - 10 = \frac{10-1}{1-4}(x - 1)$$

$$y - 10 = -3(x - 1)$$

$$y - 10 = -3x + 3$$

$$y = -3x + 13$$

$$f(2) = -3(2) + 13 = -6 + 13 = 7$$

$$f'(2) = -3$$