46. $f(u) = 2u^{3/2} + 4u^{3/4}$

$$f'(u) = \frac{3}{2} \cdot 2u^{(3/2 - 2/2)} + \frac{3}{4} \cdot 4u^{(3/4 - 4/4)}$$
$$= 3u^{1/2} + 3u^{-1/4}$$

$$\frac{d}{du} f(u) = 3u^{1/2} + 3u^{-1/4}$$

To find the derivative of the function, I used the idea of finding derivatives of some power, where I took the power that the variable "u" was raised to and brought it down and multiplied it by the constant infront of the variable. Then I reduced the power that the "u" was raised to by one, to get the power the variable "u" would be raised to in the derivative.

68. $y = f(x) = x^{-3/2}$, $x_0 = 4$

$$f'(x) = -\frac{3}{2} x^{-3/2 - 2/2}$$
$$= -\frac{3}{2} x^{-5/2}$$

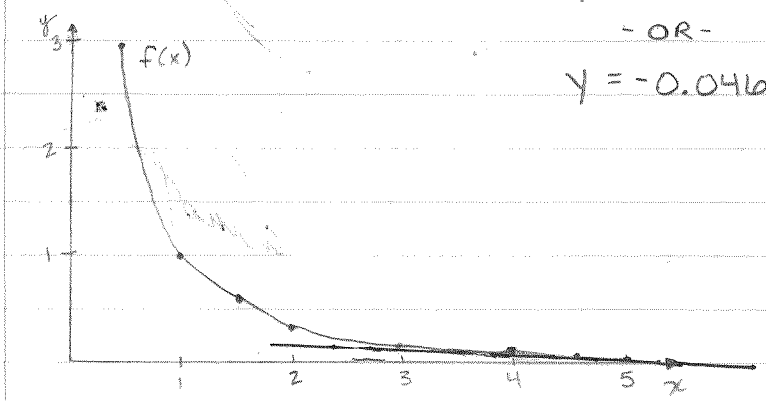
$$f(4) = 4^{-3/2}$$
$$= \frac{1}{8}$$

$$f'(4) = -\frac{3}{2}(4)^{-5/2}$$
$$= -\frac{3}{2}(1/32)$$
slope $= -3/64$

$$y - 1/8 = -3/64(x - 4)$$
$$y - 1/8 = -3/64 x + 3/16$$
$$y = -3/64 x + 5/16$$

- OR -

$$y = -0.046875x + 0.3125$$



To find the equation of the tangent line at the point where x=4, I first found the derivative of the original function. Then I plugged in four for the variable "x" in the derivative and solved to find the slope of the tangent line at x=4. Then I plugged in four for "x" in the original function to get a complete point, so I could use the point-slope equation to find the equation for the tangent line. Next I plugged in the slope $(-3/64)$ and the point $(4, 1/8)$ into the equation $y - y_1 = m(x - x_1)$ and simplified the equation of the tangent line to $y = -3/64 x + 5/16$, $y = -0.046875x + 0.3125$, in decimal form.