

**Problem 6** (20 points).

(6 points) a) Find the inverse of  $h(x) = \log(4x + 3)$ .

$$h(x) = \log(4x + 3)$$

$$X = \log(4y + 3)$$

(Switch  $x$  and  $y$ )

(Now solve for  $y$ )

$$10^x = 4y + 3$$

$$10^x - 3 = 4y$$

$$\frac{10^x - 3}{4} = y = h^{-1}(x)$$

(6 points) b) Show that  $(h \circ h^{-1})(x) = x$  and  $(h^{-1} \circ h)(x) = x$ . Use  $h^{-1}$  from part b) adjust part b) if necessary.

(Respect order of operations here)

$$h \circ h^{-1}(x) = \log\left(4\left(\frac{10^x - 3}{4}\right) + 3\right)$$

$$= \log(10^x - 3 + 3)$$

$$= \log(10^x) = X \checkmark$$

$$h^{-1}(h(x)) = \frac{10^{\log(4x+3)} - 3}{4} = \frac{4x + 3 - 3}{4}$$

$$= \frac{4x}{4} = X \checkmark$$