

2.3.73

Exercise 2.3.73. Consider $h(x) = x^2 - 2x$.

(a) Find the average rate of change from 2 to 4.

(b) Find an equation of the secant line containing $(2, h(2))$ and $(4, h(4))$.

Solution

(a) The average rate of change of h from a to b is $\frac{h(b) - h(a)}{b - a}$, so here the

average rate of change from $a=2$ to $b=4$ is

$$\frac{h(4) - h(2)}{(4) - (2)} = \frac{((4)^2 - 2(4)) - ((2)^2 - 2(2))}{(4) - (2)}$$
$$= \frac{(16 - 8) - (4 - 4)}{4 - 2} = \frac{8 - 0}{2} = \boxed{4}$$

(b) The slope of the secant line is the average rate of change, so $m=4$. Using the point $(2, h(2)) = (2, (2)^2 - 2(2)) = (2, 0) = (x_1, y_1)$ in the point slope form of a line,

$y - y_1 = m(x - x_1)$ we have the secant line as $y - (0) = (4)(x - (2))$ or $y = 4(x - 2)$

or $\boxed{y = 4x - 8}$ \square