

Exercise 7

For the following exercises, points $P(4, 2)$ and $Q(x, y)$ are on the graph of the function $f(x) = \sqrt{x}$.

Complete the following table with the appropriate values: y -coordinate of Q , the point $Q(x, y)$, and the slope of the secant line passing through points P and Q . Round your answer to eight significant digits.

x	y	$Q(x, y)$	m_{sec}
4.1	a.	e.	i.
4.01	b.	f.	j.
4.001	c.	g.	k.
4.0001	d.	h.	l.

Solution

If $x = 4.1$, then $y = \sqrt{4.1} \approx 2.0248457$, which means $Q(4.1, 2.0248457)$ and

$$m_{\text{sec}} \approx \frac{2.0248457 - 2}{4.1 - 4} \approx 0.24845673.$$

If $x = 4.01$, then $y = \sqrt{4.01} \approx 2.0024984$, which means $Q(4.01, 2.0024984)$ and

$$m_{\text{sec}} \approx \frac{2.0024984 - 2}{4.01 - 4} \approx 0.24984395.$$

If $x = 4.001$, then $y = \sqrt{4.001} \approx 2.0002500$, which means $Q(4.001, 2.0002500)$ and

$$m_{\text{sec}} \approx \frac{2.0002500 - 2}{4.001 - 4} \approx 0.24998438.$$

If $x = 4.0001$, then $y = \sqrt{4.0001} = 2.0000250$, which means $Q(4.0001, 2.0000250)$ and

$$m_{\text{sec}} \approx \frac{2.0000250 - 2}{4.0001 - 4} \approx 0.24999844.$$

For $f(x) = \sqrt{x}$, the slope of the secant line passing through P and Q gets closer and closer to 0.25 as x gets closer and closer to 4.