Exercise 13

For the following exercises, points $P(-1,-1)$ and $Q(x,y)$ are on the graph of the function $f(x)=\frac{1}{x}$.

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}
−1.05	a.	e.	i.
−1.01	b.	f.	j.
−1.005	c.	g.	k.
−1.001	d.	h.	l.

Solution

If $x=-1.05$, then $y=\frac{1}{-1.05}\approx -0.95238095$, which means $Q(-1.05,-0.95238095)$ and

$$m_{\text{sec}}\approx\frac{-0.95238095-(-1)}{-1.05-(-1)}\approx -0.95238095.$$

If $x=-1.01$, then $y=\frac{1}{-1.01}\approx -0.99009901$, which means $Q(-1.01,-0.99009901)$ and

$$m_{\text{sec}}\approx\frac{-0.99009901-(-1)}{-1.01-(-1)}\approx -0.99009901.$$

If $x=-1.005$, then $y=\frac{1}{-1.005}\approx -0.99502488$, which means $Q(-1.005,-0.99502488)$ and

$$m_{\text{sec}}\approx\frac{-0.99502488-(-1)}{-1.005-(-1)}\approx -0.99502488.$$

If $x=-1.001$, then $y=\frac{1}{-1.001}=-0.99900100$, which means $Q(-1.001,-0.99900100)$ and

$$m_{\text{sec}}\approx\frac{-0.99900100-(-1)}{-1.001-(-1)}\approx -0.99900100.$$

For $f(x)=\frac{1}{x}$, the slope of the secant line passing through P and Q gets closer and closer to -1 as x gets closer and closer to -1.