Exercise 25

Use a table of values to estimate the value of the limit. If you have a graphing device, use it to confirm your result graphically.

$$\lim_{\theta \to 0} \frac{\sin 3\theta}{\tan 2\theta}$$

Solution

Evaluate the given function at several values of θ.

$$\left.\frac{\sin 3\theta}{\tan 2\theta}\right|_{\theta=-0.1} = 1.45785$$

$$\left.\frac{\sin 3\theta}{\tan 2\theta}\right|_{\theta=-0.01} = 1.49958$$

$$\left.\frac{\sin 3\theta}{\tan 2\theta}\right|_{\theta=-0.001} = 1.5$$

$$\left.\frac{\sin 3\theta}{\tan 2\theta}\right|_{\theta=0.001} = 1.5$$

$$\left.\frac{\sin 3\theta}{\tan 2\theta}\right|_{\theta=0.01} = 1.49958$$

$$\left.\frac{\sin 3\theta}{\tan 2\theta}\right|_{\theta=0.1} = 1.45785$$

Therefore,

$$\lim_{\theta \to 0} \frac{\sin 3\theta}{\tan 2\theta} = 1.5 = \frac{3}{2}.$$