Question

Find the exact value of each of the following. In each case, show your work and explain the steps you take to find this value.

Sin $\dfrac{17\pi}{6}$

tan $\dfrac{13\pi}{4}$

sec $\dfrac{11\pi}{3}$

Solution

$$sin\frac{17\pi}{6} = sin\left(2\pi + \frac{5\pi}{6}\right) = |2\pi \ is \ the \ period \ of \ the \ sine \ function| =$$

$$= sin\left(\frac{5\pi}{6}\right) = sin\left(\pi - \frac{\pi}{6}\right) = sin\left(\frac{\pi}{6}\right) = \frac{1}{2},$$

$$tan\frac{13\pi}{4} = tan\left(3\pi + \frac{\pi}{4}\right) = tan\left(\pi + \pi + \pi + \frac{\pi}{4}\right) =$$

$$= |\pi \ is \ the \ period \ of \ the \ tangent \ function| = tan\left(\frac{\pi}{4}\right) = 1,$$

$$sec\left(\frac{11\pi}{3}\right) = \frac{1}{cos\left(\frac{11\pi}{3}\right)} = \frac{1}{cos\left(3\pi + \frac{2\pi}{3}\right)} = \frac{1}{cos\left(2\pi + \pi + \frac{2\pi}{3}\right)} =$$

$$= |2\pi \ is \ the \ period \ of \ the \ cosine \ function| = \frac{1}{cos\left(\pi + \frac{2\pi}{3}\right)} = -\frac{1}{cos\left(\frac{2\pi}{3}\right)} = -\frac{1}{-\frac{1}{2}} =$$

$$= 2.$$