The half-angle formula for the sine function:

$$\sin\frac{\alpha}{2}=\pm\frac{\sqrt{1-\cos\alpha}}{2}$$

$\sin\frac{5x}{8}\Rightarrow\alpha=\frac{5x}{4}$,

Applying the half-angle formula we have:

$$\sin\frac{5x}{8}=\pm\frac{\sqrt{1-\cos\frac{5x}{4}}}{2}$$

The sign of the right part of the equation will be:

- positive if $0\le\frac{\alpha}{2}\le\pi$ and hence if $0\le x\le\frac{4\pi}{5}$;
- negative if $\pi\le\frac{\alpha}{2}\le 2\pi$, so $\frac{4\pi}{5}\le x\le\frac{8\pi}{5}$.