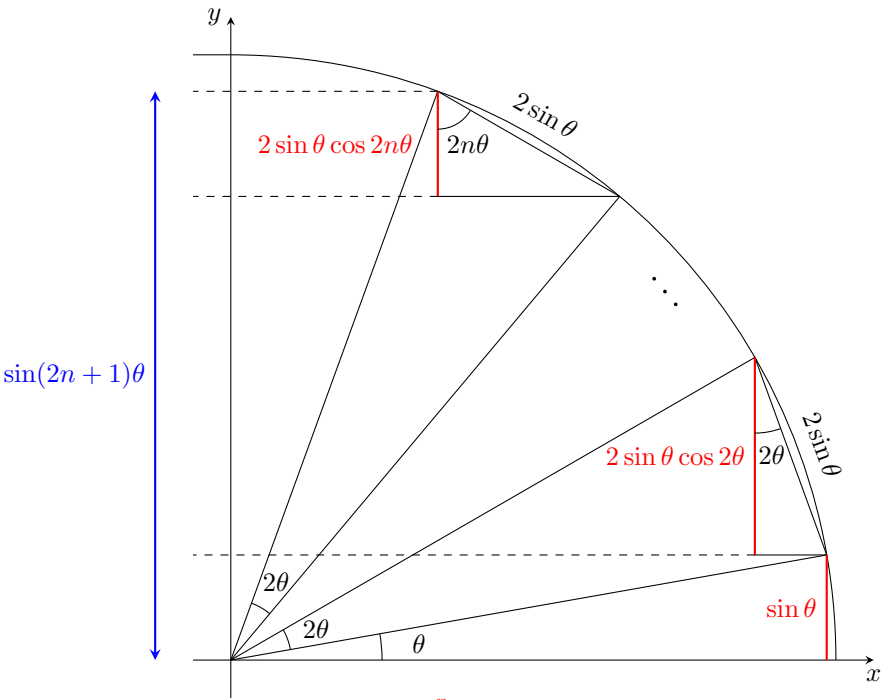

$$\sin(2n+1)\theta = \sin\theta + 2\sin\theta \sum_{k=1}^{n} \cos 2k\theta$$

$$\sum_{k=1}^{n} \cos 2k\theta = -\frac{1}{2} + \frac{\sin(2n+1)\theta}{2\sin\theta}$$