

5.5) Small angle approximations

Worked example

When θ is small, find the approximate value of:

- a) $\frac{\sin \theta + \tan 4\theta}{3\theta}$
b) $\frac{\cos 6\theta - 1}{\theta \tan 3\theta}$
c) $\sin 3\theta + \tan 4\theta - \cos 5\theta$

Your turn

When θ is small, find the approximate value of:

- a) $\frac{\sin 2\theta + \tan \theta}{2\theta}$
b) $\frac{\cos 4\theta - 1}{\theta \sin 2\theta}$
c) $\sin 5\theta + \tan 2\theta - \cos 2\theta$

a) $\frac{3}{2}$

b) -4

c) -1

Worked example

Find the percentage error when calculating the value of $\cos(0.123 \text{ rad})$ using the small-angle approximations

Your turn

Find the percentage error when calculating the value of $\cos(0.246 \text{ rad})$ using the small-angle approximations

0.015701% (6 dp)

Worked example

When θ is small, find the approximate value of:

$$\frac{\sin \theta - \cos 6\theta - 4}{\sin 2\theta - 1}$$

Your turn

When θ is small, find the approximate value of:

$$\frac{1 - 2 \tan \theta - 4 \cos 2\theta}{\tan 2\theta + 1}$$

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