

3. Find $\frac{dy}{d\theta}$ for each of the following:

(i) $y = 2 \sin 3\theta + \cos 2\theta$

(ii) $y = \tan^2\theta + \tan 2\theta$

Addition Rule and

Chain Rule

outer: $2 \sin x$

inner: 3θ

outer: $\cos x$

inner: 2θ

Addition and
Chain Rule

outside: u^2

inside: $\tan\theta$

outside: $\tan x$

inside: 2θ

(i)

$$y = \underline{2 \sin 3\theta} + \underline{\cos 2\theta}$$

$$\frac{dy}{d\theta} = \underbrace{(2 \cos 3\theta)}_{\text{D.o.o.}} \cdot \underbrace{(3)}_{\text{x DoI}} + \underbrace{(-\sin 2\theta)}_{\text{Doo}} \cdot \underbrace{(2)}_{\text{x DoI}}$$

$$= 6 \cos 3\theta - 2 \sin 2\theta$$

(ii)

$$y = \underline{\tan^2\theta} + \underline{\tan 2\theta}$$

$$\frac{dy}{d\theta} = \underbrace{2(\tan\theta)'}_{\text{D.o.o.}} \cdot \underbrace{\sec^2\theta}_{\text{x DoI}} + \underbrace{\sec^2 2\theta}_{\text{Doo}} \cdot \underbrace{(2)}_{\text{x DoI}}$$

$$= 2 \tan\theta \sec^2\theta + 2 \sec^2 2\theta$$