Let $y = \sin x$.

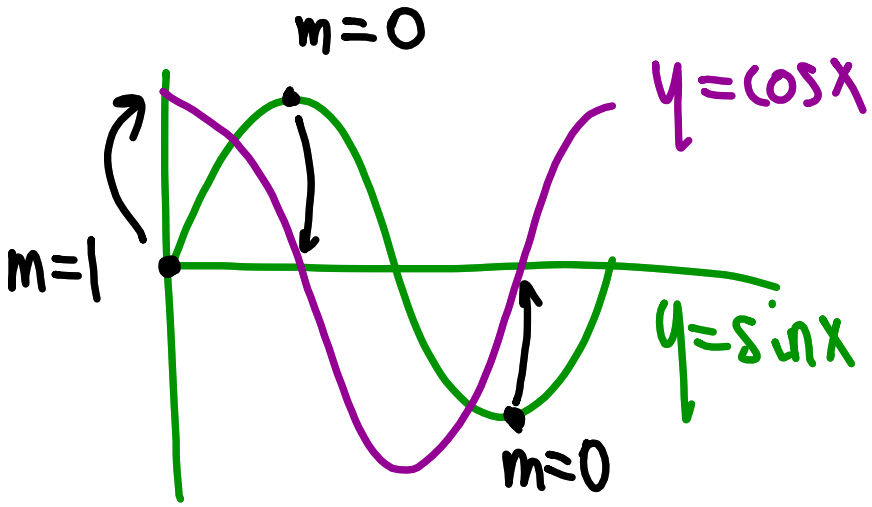
Find $\frac{dy}{dx}$.

$$\lim_{h \to 0} \frac{\sin(x+h) - \sin x}{h}$$

$$\lim_{h \to 0} \frac{\sin x \cos h + \cos x \sin h - \sin x}{h}$$

$$\lim_{h \to 0} \frac{\sin x(\cos h - 1)}{h} + \frac{\cos x \sin h}{h} = \cos x$$

$$(\sin x)' = \cos x$$



$$y = \cos x$$

$$\frac{dy}{dx} = \lim_{h \to 0} \frac{\cos(x+h) - \cos x}{h}$$

$$= \lim_{h \to 0} \frac{\cos x \cos h - \sin x \sin h - \cos x}{h}$$

$$= \lim_{h \to 0} \frac{\cos x(\cos h - 1)}{h} - \frac{\sin x \sin h}{h} = -\sin x$$

$\cos h \to 0$

$$\frac{d(\cos x)}{dx} = -\sin x$$

Find $f'(x)$

1) $f(x) = \sin 2x$

$= \sin(2x)$

$f'(x) = \cos(2x) \cdot 2$

$= 2\cos(2x)$

2) $f(x) = \sin^2 x$

$= (\sin x)^2$

$f'(x) = 2(\sin x)\cos x$

$= \sin(2x)$

$$\cos(2x) = 1 - 2\sin^2 x$$

$$\cos(2x) - 1 = -2\sin^2 x$$

$$\frac{\cos(2x)}{-2} + \frac{1}{2} = \sin^2 x$$

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$$\frac{d}{dx}\left(\frac{\cos(2x)}{-2} + \frac{1}{2}\right)$$

$$= \frac{+1}{2}(+\sin(2x)2) = \sin(2x)$$