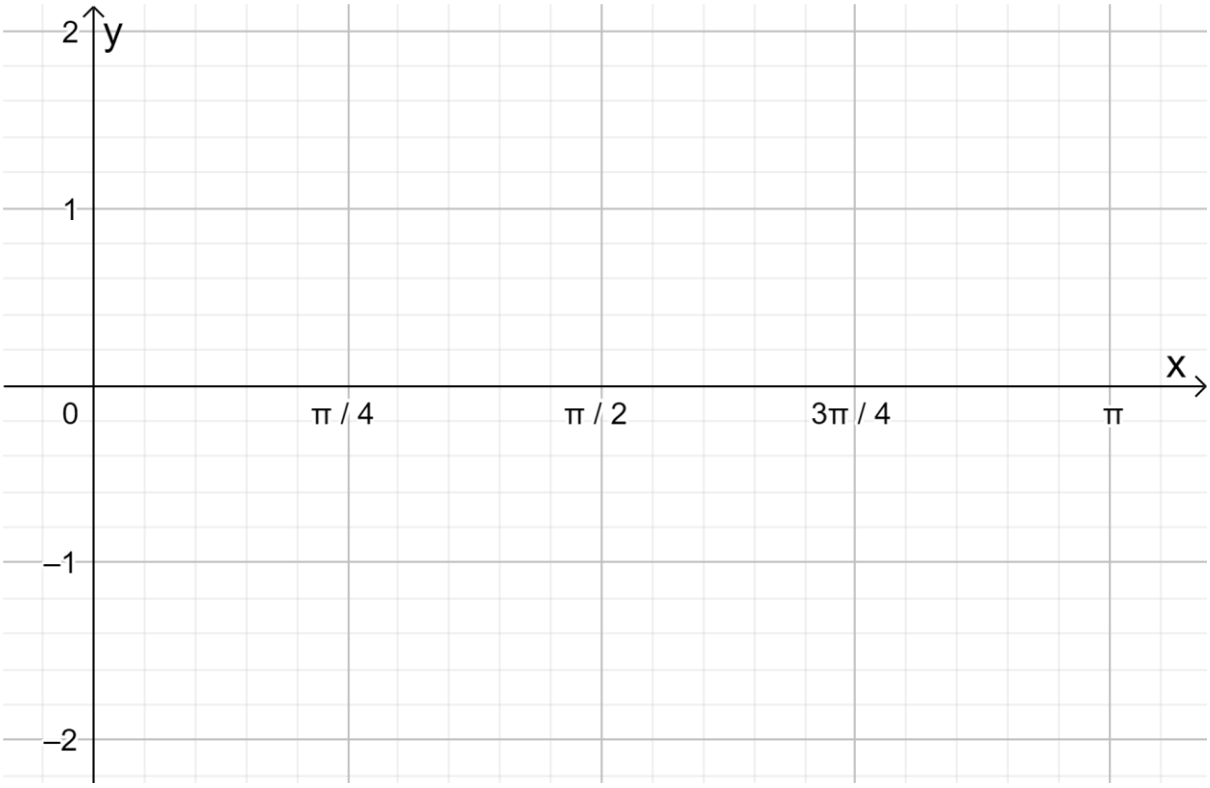
Let $f(x) = (cos2x - sin2x)^2$

a) Show that $f(x)$ can be expressed as 1 – sin4x

b) Let f(x) = 1 – sin4x. Sketch the graph of $\boldsymbol{f}$ for $0 \le x \le \pi$



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a)

$$f(x) = (cos2x - sin2x)^2$$

$$= (cos2x - sin2x)(cos2x - sin2x)$$

$$= cos^2 2x - 2cos2xsin2x + sin^2 2x$$

$$cos^2\theta + sin^2\theta \equiv 1$$

$$2cos^2x + cosx - 1 = 0$$

Therefore

$$cos^2 2x + sin^2 2x \equiv 1$$

$$= 1 - 2cos2xsin2x$$

$$sin2\theta \equiv 2sin\theta cos\theta$$

Therefore

$$sin4x \equiv 2sin2xcos2x$$

$$= 1 - sin4x$$

b)

Consider the graph y = sinx

Stretch by a factor of $\frac{1}{4}$ in the x direction

Reflect in the x axis

Translate up 1 unit