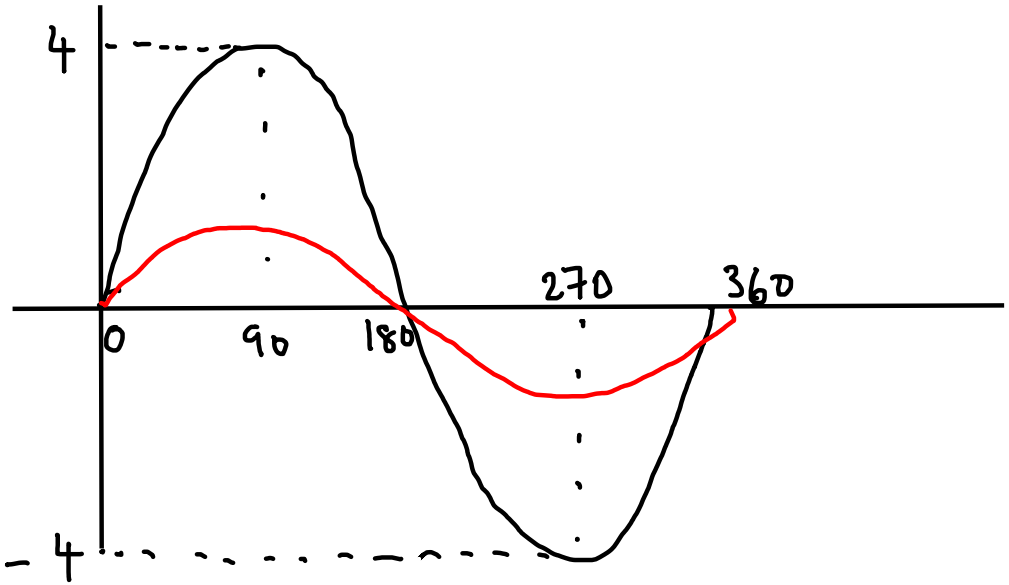
Transforming Trigonometric Graphs

There is no new theory here: just use your knowledge of transforming graphs, i.e. whether the transformation occurs 'inside' the function (i.e. input modified) or 'outside' the function (i.e. output modified).

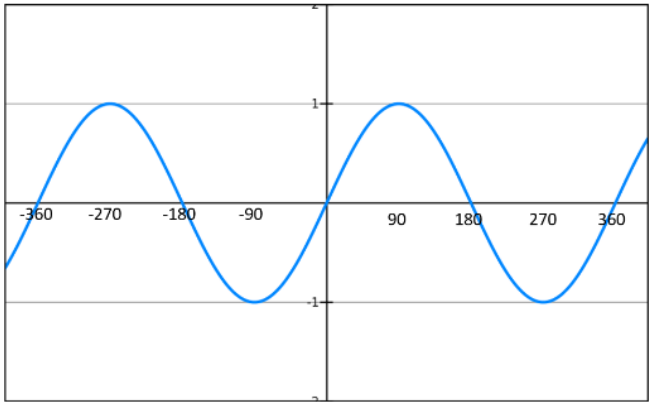
Sketch $y = 4\sin x, 0 \leq x \leq 360°$



$f(x) = \sin x$

$4f(x) = 4\sin x$

↕ SF x4



Sketch $y = \cos(x + 45°), 0 \leq x \leq 360°$

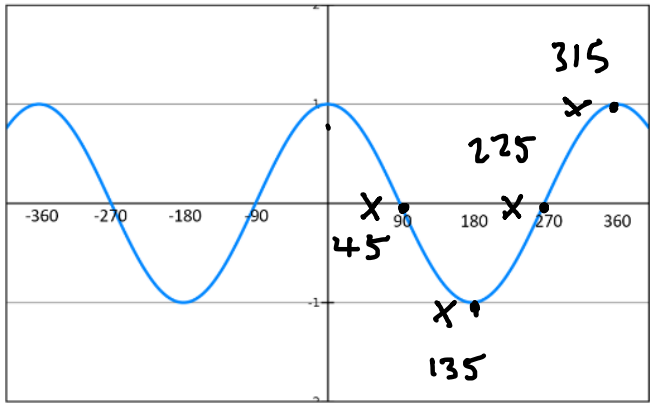
$f(x) = \cos x$

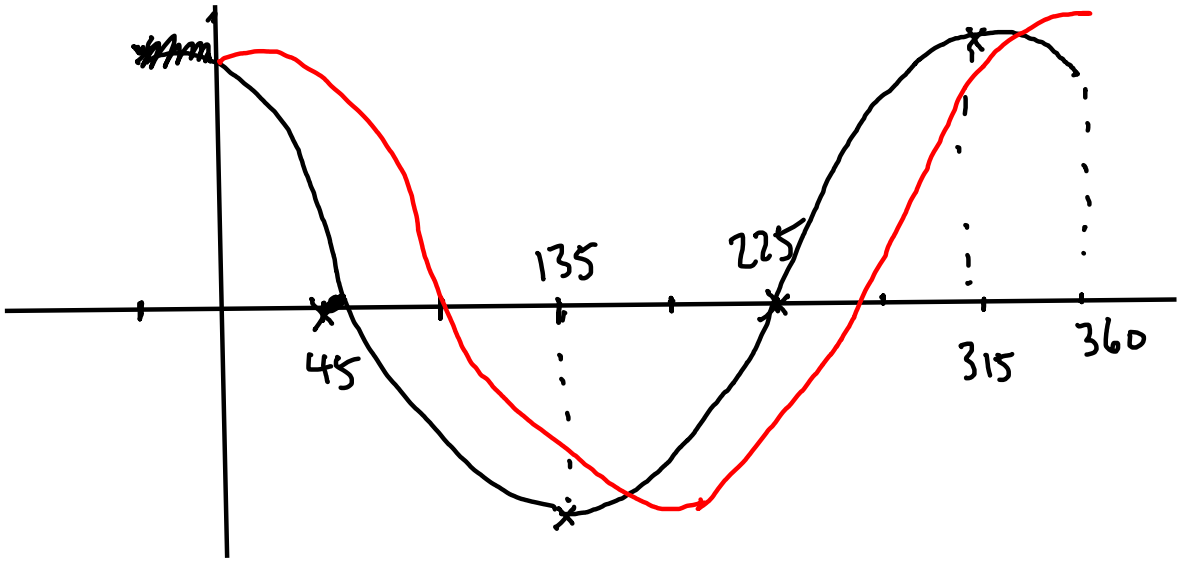
~~$f(x) + 45 = \cos x + 45$~~

$f(x + 45) = \cos(x + 45)$

Translation $\begin{pmatrix} -45 \\ 0 \end{pmatrix}$

45 left.



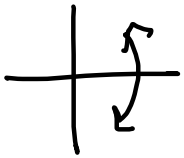


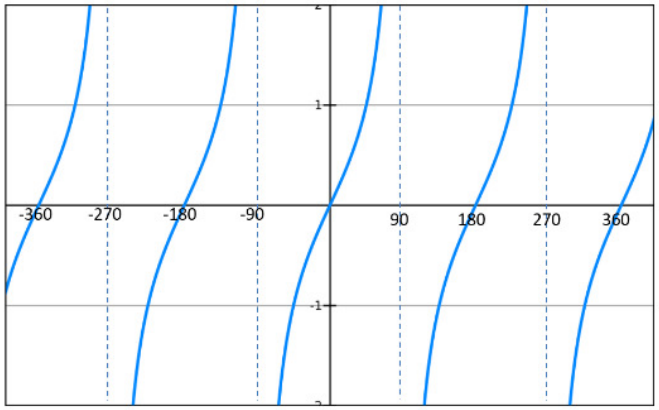
Sketch $y = -\tan x,\ 0 \leq x \leq 360°$

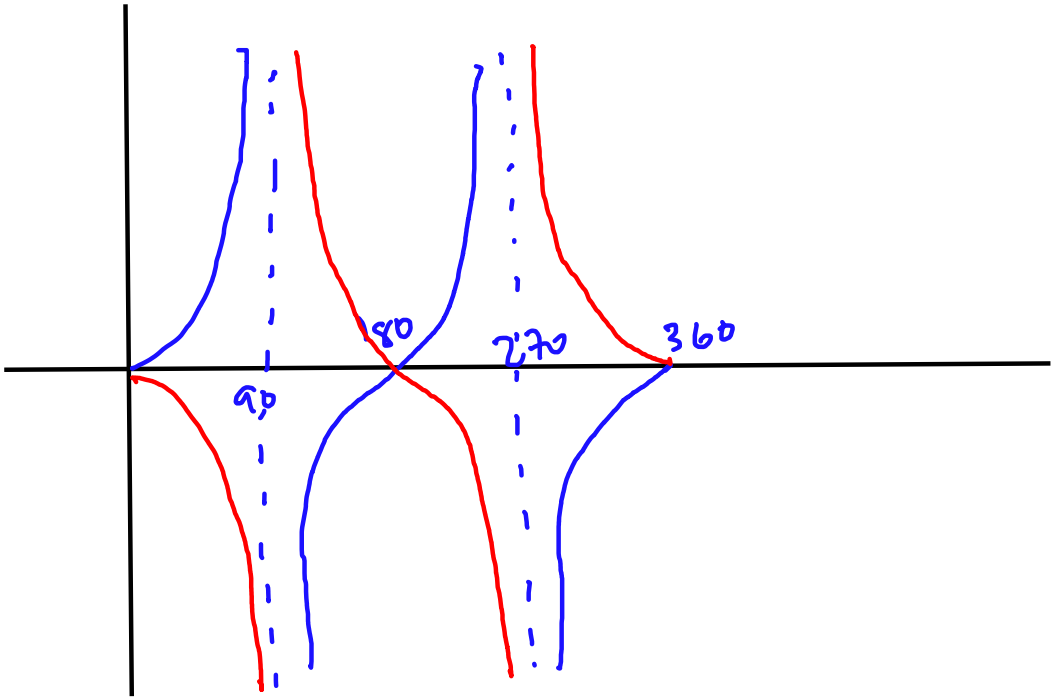
$-f(x) = \tan x$

$-f(x) = -\tan x$

Reflection x-axis





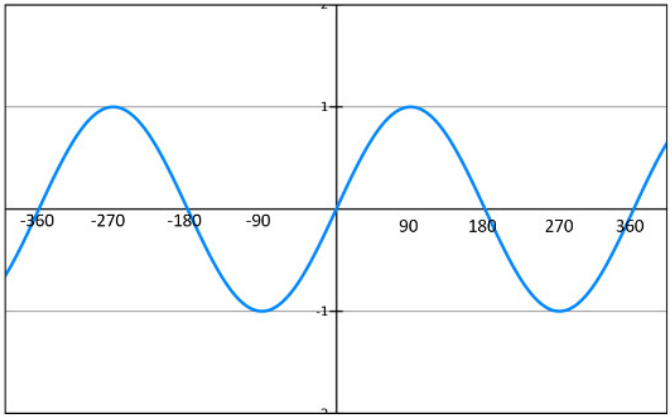


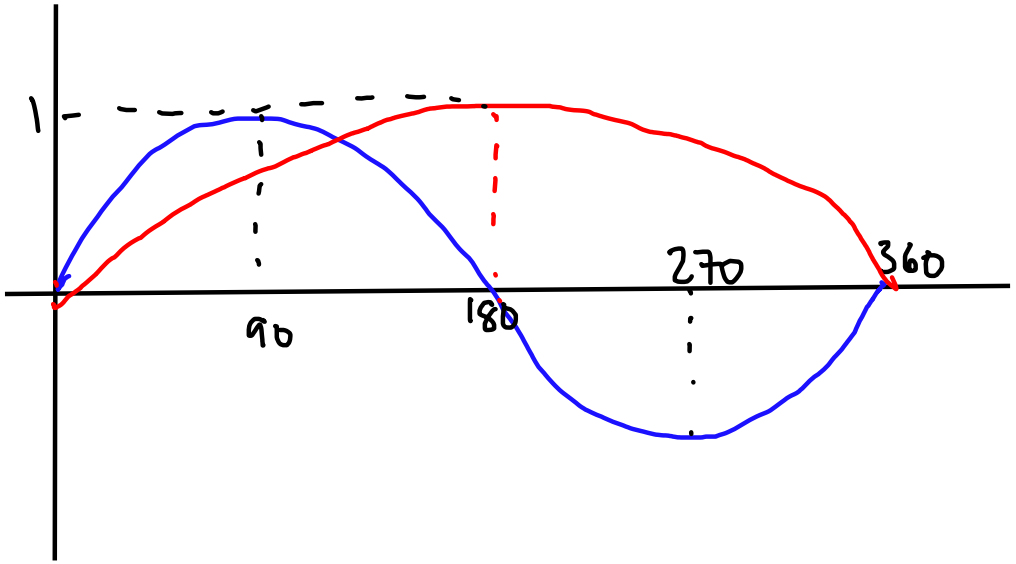
Sketch $y = \sin\left(\frac{x}{2}\right), 0 \leq x \leq 360°$

$f(x) = \sin x$

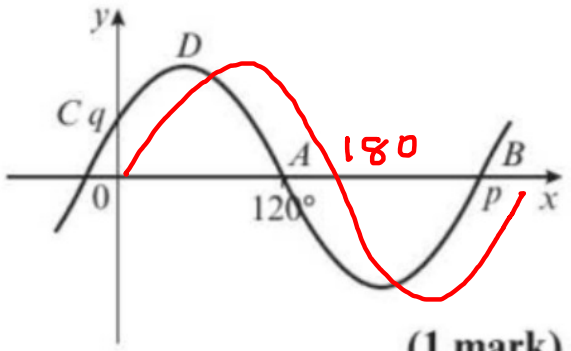
$f\left(\frac{x}{2}\right) = \sin\left(\frac{x}{2}\right)$

$f\left(\frac{1}{2}x\right)$ $\longleftrightarrow$ stretch SF $\times 2$





14 The diagram shows part of the graph of $y = f(x)$.
It crosses the x-axis at $A(120°, 0)$ and $B(p, 0)$.
It crosses the y-axis at $C(0, q)$ and has a maximum value at D, as shown.



Trans $\begin{pmatrix} -k \\ 0 \end{pmatrix}$ $\begin{pmatrix} -60 \\ 0 \end{pmatrix}$

Given that $f(x) = \sin(x + k)$, where $k > 0$, write down

a the value of p **(1 mark)**

b the coordinates of D **(1 mark)**

c the smallest value of k **(1 mark)**

d the value of q. **(1 mark)**

Ex 9G

a) 300

b) (30, 1)

c) 60

d) $f(x) = \sin(x + 60)$ $x = 0$

$f(0) = \sin 60$

$q = \frac{\sqrt{3}}{2}$