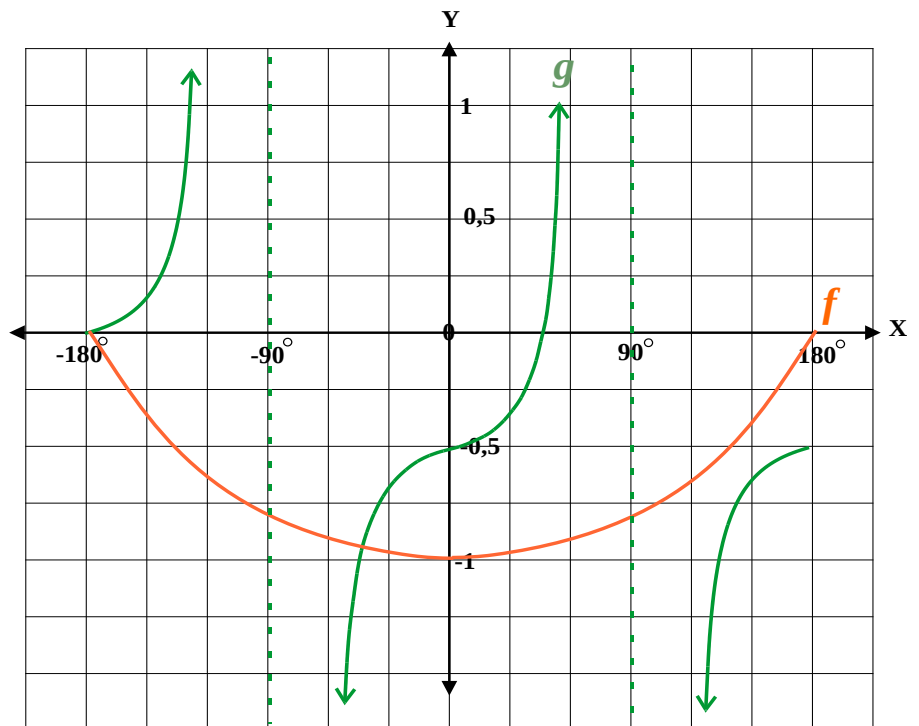


Exercise 2025-12 EJ-00007(1) Trigonometry – Graphs

- (1) Given: $p(x) = \cos 2x$ and $t(x) = -\sin x$ with $x \in [-180^\circ; 360^\circ]$
- (a) Determine x if $\cos 2x + \sin x = 0$. Show all calculations.
 - (b) Sketch the graphs of p and t on the same system of axes.
 - (c) Write down the period of p .
 - (d) Write down the amplitude of t .
 - (e) For which values of x is $t(x) \leq 0$?
 - (f) For which values of x is $t(x) > p(x)$?
 - (g) Determine the equation of $f(x)$ if $f(x)$ is the equation of $t(x)$ which moves 30° to the left.

- (2) The graphs of
 $f(x) = a \cos bx$
and $g(x) = c \tan x + d$
are sketched for
 $x \in [-180^\circ; 180^\circ]$.
Study the graphs
and answer the
questions below.



- (a) Determine the values of a ; b ; c and d .
- (b) Write down the period of g .
- (c) Write down the amplitude of f .
- (d) For which values of x is $f(x) \cdot g(x) < 0$?
- (e) For which values of x is $f(x) - g(x) = 0,5$? Show on the graph where the reading was done?
- (f) Determine the equation of $h(x)$ if $h(x)$ is the mirror image of $f(x)$ in the x -axis.

- (3) (a) Determine the general solution of $\sin 2x = \cos(x + 60^\circ)$.
- (b) Determine the values of x where $\sin 2x = \cos(x + 60^\circ)$ for $-90^\circ \leq x \leq 180^\circ$.
- (c) Sketch on the same system of axes the graphs of $g(x) = \sin 2x$ and $h(x) = \cos(x + 60^\circ)$ for $-90^\circ \leq x \leq 180^\circ$. Clearly show all the interceptions with the axes as well as the turning points.
- (d) Write down the range of h .
- (e) Use your answers in (a) and determine x for which:
- (i) $\sin 2x < \cos(x + 60^\circ)$
 - (ii) $g(x) \cdot h(x) \geq 0$

