Q6.1

Range of f: $y \in [-2 ; 0]$

Q6.2

$x \in (90° ; 270°)$

Q6.3

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

$= 1 - 2\sin^2 x - \sin x + 1$

$= -2\sin^2 x - \sin x + 2$

$\sin x = -\dfrac{b}{2a}$

$= \dfrac{-(-1)}{2(-2)}$

$\sin x = -\dfrac{1}{4}$

$\therefore x = 194,48°$ or $x = 345,52°$

Q6.1

$\cos(x - 30°) = 2\sin x$

$\cos x \cos 30° + \sin x \sin 30° = 2\sin x$

$\dfrac{\sqrt{3}}{2}\cos x + \dfrac{1}{2}\sin x = 2\sin x$

$\dfrac{\sqrt{3}}{2}\cos x = \dfrac{3}{2}\sin x$

$\tan x = \dfrac{\sqrt{3}}{3}$

$x = 30° + k.180°; \quad k \in Z$

Q6.2.1a

A(120° ; 0)

Q6.2.1b

C(−150° ; −1)

Q6.2.2a

$-90° < x < 30°$

Q6.2.2b

$-160° < x < 20°$

Q6.2.3

Range of $y = 2\sin x$: $y \in [-2 ; 2]$ **OR** $-2 \le y \le 2$

Range of $y = 2\sin x + 3$: $y \in [1 ; 5]$ **OR** $1 \le y \le 5$

Range: $y = 2^{2\sin x + 3}$: $y \in [2 ; 32]$ **OR** $2 \le y \le 32$

June 2018

Q6.1

Period = 720°

Q6.2

$-2 \le y \le 2$

Q6.3

$f(-120°) - g(-120°)$

$= -3\sin\left(-\dfrac{120°}{2}\right) - 2\cos(-120° - 60°)$

$= \dfrac{4 + 3\sqrt{3}}{2}$ or   4,60 (4,5980...)

Q6.4.1

x-intercepts of g at $-90° + 60° = -30°$
and $90° + 60° = 150°$

$-30° < x < 150°$

Q6.4.2

$-180° \le x < -120°$

$-30° < x < 60°$

$150° < x \le 180°$

March 2018

Q5.5.1

$g(x) = -4\cos(x + 30°)$
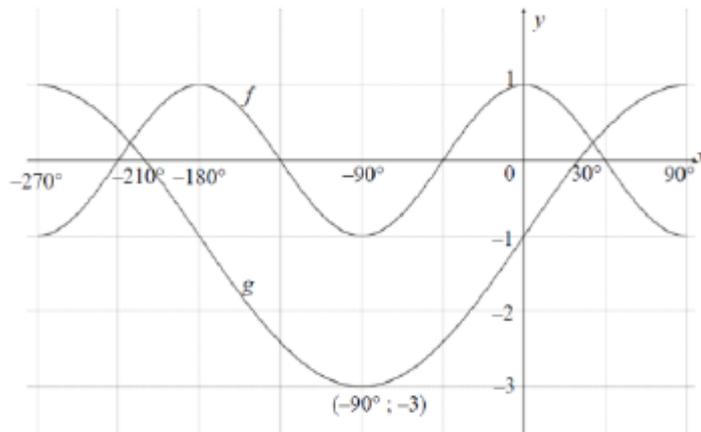
maximum value = 4

Q5.5.2

range of/*waardeversameling van* $g(x)$:
$-4 \le y \le 4$ **OR/OF** $y \in [-4 ; 4]$

$\therefore$ range of/*waardeversameling van* $g(x) + 1$:
$-3 \le y \le 5$ **OR/OF** $y \in [-3 ; 5]$

Q5.5.3

$y = -4\cos(x + 30°)$
shifted to the left/*skuif na links*:
$y = -4\cos(x + 30° + 60°)$

$= -4\cos(x + 90°)$

$= 4\sin x$

$\therefore h(x) = -4\sin x$

Q6.1

Q6.2

$$\cos 2x = 2 \sin x - 1$$

$$1 - 2 \sin^2 x = 2 \sin x - 1$$

$$2 \sin^2 x + 2 \sin x - 2 = 0$$

$$\sin^2 x + \sin x - 1 = 0$$

$$\sin x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$= \frac{-1 \pm \sqrt{1^2 - 4(1)(-1)}}{2(1)}$$

$$\sin x = \frac{-1 + \sqrt{5}}{2}$$

since $\sin x = \dfrac{-1 - \sqrt{5}}{2} < -1$ has no solution

Q6.3

$\sin x = \dfrac{-1 + \sqrt{5}}{2} = 0{,}618...$

Reference $\angle = 38{,}17°$

$\therefore x = 38{,}17° + k.360°$ or $x = 141{,}83° + k.360°$; $k \in Z$

$\therefore x = 38{,}17°$ or $-218{,}17°$

$y = 0{,}24$

$\therefore$ Points of intersection/*snypunte*:

$(38{,}17° ; 0{,}24)$ and $(-218{,}17° ; 0{,}24)$