1. The table shows some values of x and y that satisfy the equation $y = a\cos x° + b$

x	0	30	60	90	120	150	180
y	3	$1 + \sqrt{3}$	2	1	0	$1 - \sqrt{3}$	-1

Find the value of y when $x = 45$

$y = a\cos x° + b$

When $x = 0$, $y = 3$

$3 = a \times \cos 0° + b$ $\cos 0° = 1$

$3 = a \times 1 + b$ ✓

$3 = a + b$ ✓

$3 = a + 1$

$-1 \quad -1$

$2 = a$

When $x = 90$, $y = 1$

$1 = a \times \cos 90° + b$

$1 = a \times 0 + b$

$1 = b$ ✓

When $x = 45$

$y = 2 \times \cos 45° + 1$

$y = 2 \times \frac{\sqrt{2}}{2} + 1$

$y = \sqrt{2} + 1$

$\sqrt{2} + 1$ ✓

(Total for Question is 4 marks)

$\frac{6-\sqrt{8}}{\sqrt{2}-1} \times \frac{\sqrt{2}+1}{\sqrt{2}+1}$ ✓

$= \frac{(6-\sqrt{8})(\sqrt{2}+1)}{(\sqrt{2}-1)(\sqrt{2}+1)}$

$= \frac{6\sqrt{2} + 6 - \sqrt{8\times 2} - \sqrt{8}}{2 + \sqrt{2} - \sqrt{2} - 1}$

$= \frac{3\sqrt{2} + 2}{1}$

$= 2 + 3\sqrt{2}$ ✓

Numerator

$6\sqrt{2} + 6 - \sqrt{8\times 2} - \sqrt{8}$

$6\sqrt{2} + 6 - \sqrt{16} - \sqrt{8}$

$6\sqrt{2} + 6 - 4 - \sqrt{8}$

$6\sqrt{2} + 2 - \sqrt{8}$

$6\sqrt{2} + 2 - \sqrt{2\times 2\times 2}$

$6\sqrt{2} + 2 - \sqrt{2}\times\sqrt{2}\times\sqrt{2}$

$6\sqrt{2} + 2 - 3\sqrt{2}$ ✓

$3\sqrt{2} + 2$

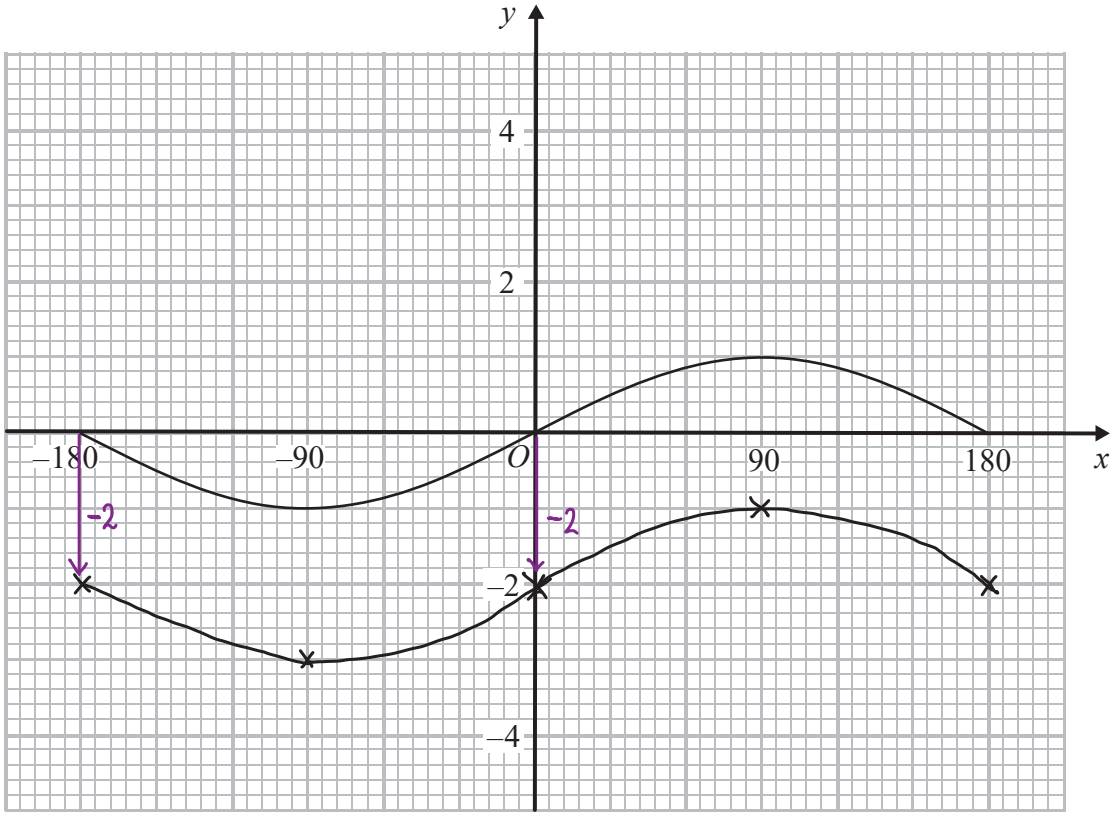
Denominator

$2 + \sqrt{2} - \sqrt{2} - 1$

$2 - 1$

$= 1$

2. Here is the graph of $y = \sin x°$ for $-180 \leqslant x \leqslant 180$



On the grid, sketch the graph of $y = \sin x° - 2$ for $-180 \leqslant x \leqslant 180$

$y = (\sin x) - 2$ ← Shifts in y are as expected

∴ a shift of -2 in the y direction

- move the curve down by 2

(Total for Question is 2 marks)