Worksheet

i) $\cos(2x+50^\circ) = \sqrt{3}/2$

$\cos y = \sqrt{3}/2$

$y_R = 30^\circ$

$y = 30^\circ$ $y = 330^\circ$

$$y = \begin{cases} 30^\circ + 360^\circ n, & n \in I \\ 330^\circ + 360^\circ n, & n \in I \end{cases}$$

$$2x + 50^\circ = \begin{cases} 30^\circ + 360^\circ n \\ 330^\circ + 360^\circ n \end{cases}$$

$$\frac{1}{2} \cdot 2x = \frac{1}{2} \begin{cases} -20^\circ + 360^\circ n \\ 280^\circ + 360^\circ n \end{cases}$$

$$x = \begin{cases} -10^\circ + 180^\circ n, & n \in I \\ 140^\circ + 180^\circ n & n \in I \end{cases}$$

$-180^\circ \le x \le 180^\circ$ so $x = \{-10^\circ, 170^\circ, 140^\circ, -40^\circ\}$

$x = \{-40^\circ, -10^\circ, 140^\circ, 170^\circ\}$

ii) $y = \cos x$

$4y^2 + 4y + 1 = 0$

$(2y+1)(2y+1) = 0$

$y = \frac{-1}{2}$

$\cos x = -1/2$

$x_r = \cos^{-1}(1/2)$

$x_r = 60^\circ$

$x = 120^\circ$ $x = 240^\circ$

iii) $7\cos(3x-18) = 4$

$y = 3x - 18$

$\hookrightarrow 7\cos y = 4$

$\cos y = 4/7$

$y_r =$

$y = 55.2^\circ$ $y = 304.8^\circ$

$y = 0.96$ $y = 5.32$

$$3x - 18 = \begin{cases} 0.96 + 2\pi n, & n \in I \\ 5.32 + 2\pi n, & n \in I \end{cases}$$

$$\frac{1}{3} \cdot 3x = \frac{1}{3} \begin{cases} 18.96 + 2\pi n, & n \in I \\ 23.32 + 2\pi n, & n \in I \end{cases}$$

$$x = \begin{cases} 6.32 + 2\pi/3\, n, & n \in I \\ 7.77 + 2\pi/3\, n, & n \in I \end{cases}$$

$0 \le x \le 2\pi$

$$x = \begin{cases} 4.32, 2.13, 0.037 \\ 5.68, 3.58, 1.49 \end{cases}$$

IV $\sin(\pi/4(x-6)) = 0.5$ $\quad \sin y = 0.5$

$y = (\pi/4(x-6))$ $\quad y_R = \pi/6$

$\pi/6 \quad 5\pi/6$

$\frac{4}{\pi} \cdot \frac{\pi}{4}(x-6) = \frac{4}{\pi}\begin{cases} \pi/6 + 2\pi n, & n \in I \\ 5\pi/6 + 2\pi n, & n \in I \end{cases}$

$x - 6 = \begin{cases} 2/3 + 8n, & n \in I \\ 10/3 + 8n, & n \in I \end{cases}$

$x = \begin{cases} 20/3 + 8n, & n \in I \\ 28/3 + 8n, & n \in I \end{cases}$

$0 \le x \le 2\pi$

$x: \{1.33\}$

V) $8\cos(2x-5) = 3$ $\quad \cos y = 3/8$

$y = 2x - 5$ $\quad y_R = 1.19$

$y = 1.19 \quad y = 5.09$

$2x - 5 = \begin{cases} 1.19 + 2\pi n, & n \in I \\ 5.09 + 2\pi n, & n \in I \end{cases}$

$2x = \begin{cases} 6.19 + 2\pi n, & n \in I \\ 10.09 + 2\pi n, & n \in I \end{cases}$

$x = \begin{cases} 3.095 + \pi n, & n \in I \\ 5.045 + \pi n, & n \in I \end{cases}$

vi) $5.2 \sin 45(x + 8^\circ) - 1 = -3$ $\quad y = 45(x + 8^\circ)$

$5.2 \sin y - 1 = -3$

$5.2 \sin y = -2$

$\sin y = -2/5.2$

$y_r = \sin^{-1}(2/5.2)$

$y_r = 22.6^\circ$

$\theta = 202.6^\circ \quad \theta = 337.4^\circ$

$\frac{1}{45} \cdot 45(x + 8^\circ) = \frac{1}{45}\begin{cases} 202.6^\circ + 360^\circ n \\ 337.4^\circ + 360^\circ n \end{cases}$

$x + 8 = \begin{cases} 4.50^\circ + 8n, & n \in I \\ 7.50^\circ + 8n, & n \in I \end{cases}$

$x = \begin{cases} 12.5^\circ + 8n, & n \in I \\ 15.5^\circ + 8n, & n \in I \end{cases}$

vii) $3\sin 2x = 2$ $[y = 2x]$

$3\sin y = 2$

$\sin y = 2/3$

$y_R = 0.73$

$y = 0.73$ $y = 2.41$

$\frac{1}{2} \cdot 2x = \frac{1}{2}\begin{cases} 0.73 + 2\pi n, & n \in I \\ 2.41 + 2\pi n, & n \in I \end{cases}$

$x = \begin{cases} 0.365 + \pi n, & n \in I \\ 1.205 + \pi n, & n \in I \end{cases}$

viii) $4\cos(x - 45°) + 7 = 10$ $[y = x - 45°]$

$4\cos y = 3$

$\cos y = 3/4$

$y_r = 41.4°$

$y = 41.4°$ $y = 318.4°$

$x - 45° = \begin{cases} 41.4° + 360°n \\ 318.4° + 360°n \end{cases}$

$x = \begin{cases} 86.4° + 360°n \\ 363.4° + 360°n \end{cases}$