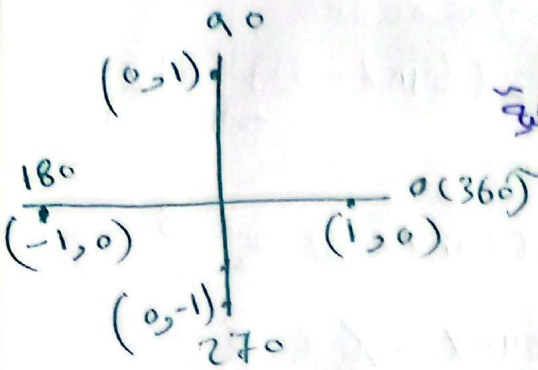
الدرس الرابع: حل المعادلات المثلثية



$0 \leq X \leq 360$

* أحل المعادلات الآتية

1) $\frac{2}{2}\sin x = \frac{1}{2}$

$\sin x = \frac{1}{2}$

$x = \sin^{-1}(\frac{1}{2}) = 30$

sinx (+)

الثاني: $\theta' = 180 - \theta$

$30 = 180 - \theta$

$-180 \quad -180$

$\theta = 150$

الأول: $\theta' = \theta$

$30 = \theta$

$[30, 150]$

2) $3\cos x - 1 = 2$

$+1 \quad +1$

$\frac{3}{3}\cos x = \frac{3}{3}$

$\cos x = 1$

$\theta = 0, 360$

3) $\frac{2}{2}\cos x = \frac{\sqrt{3}}{2}$

$\cos x = \frac{\sqrt{3}}{2} =$

$x = \cos^{-1}(\frac{\sqrt{3}}{2}) = 30$

الرابع: $\theta' = 360 - \theta$

$30 = 360 - \theta$

$-360 \quad -360$

$\theta = 330$

الأول: $\theta' = \theta$

$30 = \theta$

$0 < x \leq 360$

4) $2\tan x + 3 = 1$

$-3 \quad -3$

$\frac{2\tan x}{2} = \frac{-2}{2}$

$\tan x = -1$

$x = \tan^{-1}(1) = 45$

الربع الرابع

$\theta' = 360 - \theta$

$45 = 360 - \theta$

$-360 \quad -360$

$\theta = 315$

الربع الثاني

$\theta' = 180 - \theta$

$45 = 180 - \theta$

$-180 \quad -180$

$\theta = 135$

5) $2(\tan x - 3) + 4 = 12$

$-4 \quad -4$

$2(\tan x - 3) = 8$

$2\tan x - 6 = 8$

$+6 \quad +6$

$\frac{2}{2}\tan x = \frac{14}{2}$

$\tan x = 7$

$x = \tan^{-1}(7) = 81,9$

الأول

$\theta' = \theta$

$81,9 = \theta$

الثاني

$\theta' = \theta - 180$

$81,9 = \theta - 180$

$+180 \quad +180$

$\theta = 261,9$

6) $1 + 4\sin(3x) = 2,5 \quad 0 < x \leq 90$

$-1 \quad -1$

$\theta = 3x$

$\frac{4}{4}\sin\theta = \frac{1,5}{4}$

$\sin\theta = 0,375$

$\theta = \sin^{-1}(0,375)$

$\theta = 22,0$

$\sin(+)$

الثاني

$\theta' = 180 - \theta$

$220 = 180 - \theta$

$\theta = 158$

الأول

$\theta' = \theta$

$220 = \theta$

$\theta = 22$

$\frac{3}{3}x = \frac{22}{3}$

$x = 7,3$

$\theta = 158$

$\frac{3}{3}x = \frac{158}{3}$

$x = 52,6$

6) $3(\sin x + 2) = 3 - \sin x$, $0 \leq x \leq 360$

$3\sin x + 6 = 3 - \sin x$

$+\sin x \quad -6 \quad -6 + \sin x$

$\frac{4\sin x}{4} = \frac{-3}{4}$

$\sin x = -0,75$

$x = \sin^{-1}(0,75)$

$x = 48,6$

sin (−)

الرابع: $\theta' = 360 - \theta$

$48,6 = 360 - \theta$

$-360 \quad -360$

$\theta = 311,4$

الثالث: $\theta' = \theta - 180$

$48,6 = \theta - 180$

$+180 \quad +180$

$\theta = 228$

7) $3\cos(2x) - 1 = 0$ $\quad 0 \leq x \leq 180$

$+1 \quad +1$

$\theta = 2x$

$\frac{3\cos\theta}{3} = \frac{1}{3}$

$\cos\theta = \frac{1}{3}$

$\cos\theta = 0,33$

$\theta = \cos^{-1}(0,33)$

$\theta = 70,7$

cos (+)

الرابع: $\theta' = 360 - \theta$

$70,7 = 360 - \theta$

$-360 \quad -360$

$\theta = 289,3$

الأول: $\theta' = \theta$

$70,7 = \theta$

$\theta = 70,7$

$\frac{2x}{2} = \frac{70,7}{2}$

$x = 35,35$

$\theta = 289,3$

$\frac{2x}{2} = \frac{289,3}{2}$

$x = 144,6$

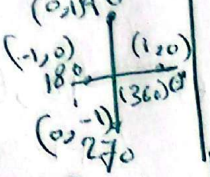
8) $3\sin x \cos x - 2\sin x = 0$

$\sin x \cdot (3\cos x - 2) = 0$

$\sin x = 0$

من دائرة الوحدة

(يتم أخذ الزوايا)



$0, 180$

$x = 360, 180, 0$

$3\cos x - 2 = 0$

$+2 \quad +2$

$\frac{3}{3}\cos x = \frac{2}{3}$

$\cos x = 0,66$

$x = \cos^{-1}(0,66) = 48,7$

$\cos x$ (+)

الرابع: $\theta' = 360 - \theta$

$48,7 = 360 - \theta$

$-360 \quad -360$

$\theta = 311,3$

الأول: $\theta' = \theta$

$48,7 = \theta$

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9) ~~$3\sin^2 x = 2\sin x + 1$~~ , ~~$0 < x < 360$~~

$3\sin^2 x - 2\sin x - 1 = 0$

~~$\sin x \cdot \sin x$~~

$\sin^2 x - 2\sin x - 3 = 0$

$(\sin x - 3)(\sin x + 1) = 0$

$\sin x = 3$

$0 \leq x < 360$

9) $3\sin^2 x = 2\sin x + 1$

$3\sin^2 x - 2\sin x - 1 = 0$

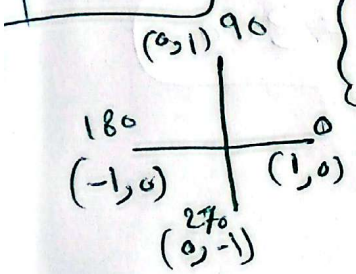
$\sin^2 x - 2\sin x - 3 = 0$

$(\sin x - \frac{3}{3})\quad(\sin x + \frac{1}{3})$

$(\sin x - 1)(3\sin x + 1) = 0$

$\sin x - 1 = 0$ (+1 +1)

$\sin x = 1$



$x = 90$

$3\sin x + 1 = 0$ (-1 -1)

$\frac{3\sin x}{3} = \frac{-1}{3}$

$\sin x = -\frac{1}{3}$

$\sin x = 0,33$

$x = \sin^{-1}(0,33)$

$x = 19,2$

sin (-)

الربع الأول

$\theta' = 360 - \theta$

$19,2 = 360 - \theta$ (-360 -360)

$\theta = 340,8$

الربع الثالث

$\theta' = \theta - 180$

$19,2 = \theta - 180$ (+180 +180)

$\theta = 199,3$

10) $4\sin x \tan x + 3\tan x = 0$

$0 \leq x \leq 360$

$\tan x \cdot (4\sin x + 3) = 0$

$\tan x = 0$

$x = 0, 360, 180$

$4\sin x + 3 = 0$ (-3 -3)

$\frac{4\sin x}{4} = \frac{-3}{4}$

$\sin x = -0,75$

$x = \sin^{-1}(0,75) = 48,5$

sin (-)

الربع الثالث

$\theta' = 360 - \theta$

$48,5 = 360 - \theta$ (-360 -360)

$\theta = 311,5$

الربع الرابع

$\theta' = \theta - 180$

$48,5 = \theta - 180$ (+180 +180)

$\theta = 228,5$

10) $2\cos^2 x - 3\cos x + 1 = 0$

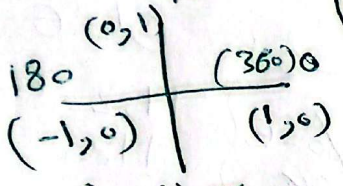
$\cos^2 x - 3\cos x + 2 = 0$

$(\cos x - 2)(\cos x - 1) = 0$

$(\cos x - 1)(2\cos x - 1) = 0$

$\cos x - 1 = 0$ $\quad +1$

$\cos x = 1$



$x = 0, 360$

$2\cos x - 1 = 0$ $\quad +1$

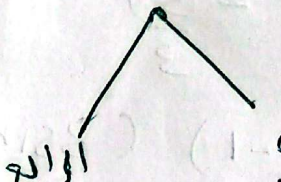
$2\cos x = 1$

$\cos x = 0,5$

$x = \cos^{-1}(0,5)$

$x = 60.$

$\cos x$ (+)



$\theta' = \theta$

$60 = \theta$

$\theta' = 360 - \theta$

$60 = 360 - \theta$

$-360 \quad -360$

$\theta = 300$