

1327)

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

$$\cos 2x = 0$$

$$2x = \pm 90^\circ + n \cdot 360^\circ$$

$$x = \pm 45^\circ + n \cdot 180^\circ$$

$$x = 45^\circ + n \cdot 180^\circ$$

$$x = -45^\circ + n \cdot 180^\circ \text{ eller } x = 135^\circ + n \cdot 180^\circ$$

$$0^\circ < x < 180^\circ$$

Begränsningen i intervallet ger lösningarna:

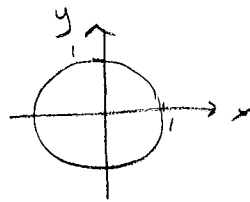
$$n = 0 \Rightarrow x = 45^\circ$$

$$(n = 1 \Rightarrow x = 225^\circ) \text{ UTANFÖRE!}$$

$$(n = 0 \Rightarrow x = -45^\circ) \text{ UTANFÖRE!}$$

$$n = 1 \Rightarrow x = 135^\circ$$

$$\text{Svar: } x = 45^\circ \text{ och } x = 135^\circ$$



(Ma4)

1328)

$$2 \cdot \sin x \cdot \cos x = 0$$

$$\sin 2x = 0$$

$$2x = 0^\circ + n \cdot 360^\circ$$

$$x = 0^\circ + n \cdot 180^\circ$$

$$(n = 0 \Rightarrow x = 0^\circ) \text{ UTANFÖRE!}$$

$$n = 1 \Rightarrow x = 180^\circ$$

$$n = 2 \Rightarrow x = 360^\circ$$

$$(n = 3 \Rightarrow x = 540^\circ) \text{ UTANFÖRE!}$$

$$100^\circ < x < 400^\circ$$

$$2x = 180^\circ + n \cdot 360^\circ$$

$$x = 90^\circ + n \cdot 180^\circ$$

$$(n = 0 \Rightarrow x = 90^\circ) \text{ UTANFÖRE!}$$

$$n = 1 \Rightarrow x = 270^\circ$$

$$(n = 2 \Rightarrow x = 450^\circ) \text{ UTANFÖRE!}$$

$$\text{Svar: } x = 180^\circ, x = 270^\circ, x = 360^\circ$$

$$1329) \quad 2 \sin x (2 \cos x - 1) = 0$$

$$\sin x = 0$$

$$x = 0^\circ + n \cdot 360^\circ \quad \left\{ \quad x = 180^\circ + n \cdot 360^\circ \right.$$



Svaren sammanfattas som

$$x = 0^\circ + n \cdot 180^\circ = n \cdot 180^\circ$$

Ngn faktor måste vara noll,
för att produkten ska bli noll.

$$\rightarrow 2 \cos x - 1 = 0$$

$$2 \cos x = 1$$

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

$$x = \pm 60^\circ + n \cdot 360^\circ$$

(OK att stanna här.)

$$\underline{\text{Svar;}} \quad x = n \cdot 180^\circ \text{ eller } x = \pm 60^\circ + n \cdot 360^\circ$$

$$1330 a) \quad \sin^2 x = 0,36$$

$$\sin x = \pm \sqrt{0,36}$$

$$\sin x = 0,6$$

$$x = 37^\circ + n \cdot 360^\circ$$

och

$$x = 180^\circ - 37^\circ + n \cdot 360^\circ =$$

$$= 143^\circ + n \cdot 360^\circ$$

$$\sin x = -0,6$$

$$x = -37^\circ + n \cdot 360^\circ = 323^\circ + n \cdot 360^\circ$$

$$x = 180^\circ - (-37^\circ) + n \cdot 360^\circ = 217^\circ + n \cdot 360^\circ$$

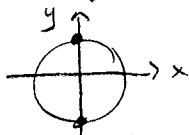
$$\underline{\text{Svar;}} \quad x = 37^\circ + n \cdot 360^\circ \text{ eller } x = 143^\circ + n \cdot 360^\circ \\ \text{eller } x = 323^\circ + n \cdot 360^\circ \text{ eller } \\ x = 217^\circ + n \cdot 360^\circ$$

$$1331) a) 2 \cos^2 x - 4 \cos x = 0$$

$$2 \underbrace{\cos x} (\underbrace{\cos x - 2}) = 0$$

$$\cos x = 0$$

$$x = \pm 90^\circ + n \cdot 360^\circ$$



Sammanfattas som $x = 90^\circ + n \cdot 180^\circ$

$$\cos x - 2 = 0$$

$$\cos x = 2,$$

Saknar lösningar.

SVAR: $x = 90^\circ + n \cdot 180^\circ$

$$b) \cos 2x = \sin 2x$$

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

$$1 = \tan 2x$$

$$2x = 45^\circ + n \cdot 180^\circ$$

$$x = 22,5^\circ + n \cdot 90^\circ$$

SVAR: $x = 22,5^\circ + n \cdot 90^\circ$

1332) se facit.

$$1333) a) \sin^2 x + 3 \sin x - 4 = 0$$

Sätt $t = \sin x \dots$

$$t^2 + 3t - 4 = 0$$

$$t = -1,5 \pm \sqrt{2,25 + 4}$$

$$t = -1,5 \pm \sqrt{6,25}$$

$$t = -1,5 \pm 2,5$$

$$t_1 = -1,5 + 2,5 = 1$$

$$t_2 = -1,5 - 2,5 = -4,0$$

$$\Rightarrow \sin x = 1$$

$$x = 90^\circ + n \cdot 360^\circ \left\{ \begin{array}{l} x = 180^\circ - 90^\circ + n \cdot 360^\circ \\ \text{(dvs blir samma} \\ \text{vinkel som)} \end{array} \right.$$

$$\Rightarrow \sin x = -4,0$$

Saknar lösning.

SVAR: $x = 90^\circ + n \cdot 360^\circ$

1333b)

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

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

Gäller bara om $\cos x \neq 0$.

$$2 \cdot \sin x = 1$$

$$\sin x = 0,5$$

$$\underline{\text{Svar:}} \quad x = 30^\circ + n \cdot 360^\circ \text{ eller } x = 150^\circ + n \cdot 360^\circ$$

1334 a)

$$\underbrace{1 - \sin^2 x}_{\cos^2 x} = 2 \cdot \cos x + \underbrace{\cos 2x}_{2 \cos^2 x - 1}$$

(cent. Trigon. ettan)

$$\cos^2 x = 2 \cdot \cos x + 2 \cos^2 x - 1$$

$$0 = 2 \cdot \cos x + \cos^2 x - 1$$

$$\text{Sätt } t = \cos x \dots$$

$$0 = 2t + t^2 - 1$$

$$\Rightarrow t^2 + 2t - 1 = 0$$

$$t = -1 \pm \sqrt{1+1}$$

$$t = -1 \pm \sqrt{2}$$

$$t_1 \approx 0,4142$$

$$t_2 \approx -2,4142$$

$$\Rightarrow \cos x = 0,4142$$

$$\Rightarrow \cos x \approx -2,4142$$

$$x \approx \pm 65,5^\circ + n \cdot 360^\circ$$

saknar lösning.

$$\underline{\text{Svar:}} \quad x \approx \pm 65,5^\circ + n \cdot 360^\circ$$

1334b)

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

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

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

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

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

$$\cos x = 0$$

$$x = \pm 90^\circ + n \cdot 360^\circ$$

$$\Rightarrow x = 90^\circ + n \cdot 180^\circ$$

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

$$2 \cos x = -1$$

$$\cos x = -0,5$$

$$x = \pm 120^\circ + n \cdot 360^\circ$$

Svar: $x = 90^\circ + n \cdot 180^\circ$ eller
 $x = \pm 120^\circ + n \cdot 360^\circ$

1335)

$$x = 15^\circ + n \cdot 180^\circ$$

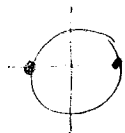
$$2x = 30^\circ + n \cdot 360^\circ$$

$$x = 75^\circ + n \cdot 180^\circ$$

$$2x = 150^\circ + n \cdot 360^\circ$$

Dessa är en lösning till $\sin 2x = 0,5$
 (slår $\sin 30^\circ$ på räknaren, för att få 0,5)

$$x = \pm 180^\circ \cdot n$$



Detta måste vara

$$\sin x = 0$$

Ekvationen skulle då kunna vara:

$$\sin x \cdot (\sin 2x - 0,5) = 0$$

... eftersom varje faktor kan vara noll, dvs...

$$\sin x = 0$$

$$\text{eller } \sin 2x - 0,5 = 0$$

$$\Rightarrow \sin 2x = 0,5$$

Svar: T.ex. $\sin x (\sin 2x - 0,5) = 0$