

1) $\cos 2x = 0,39$

$$2x = \pm 67^\circ + n \cdot 360^\circ$$

$$x \approx \pm 33,5^\circ + n \cdot 180^\circ$$

2) $5 - 4 \cdot \sin x = 2$

$$-4 \cdot \sin x = -3$$

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

$$\sin x = 0,75$$

$$x \approx 48,6^\circ + n \cdot 360^\circ$$

$$x = 180^\circ - 48,6^\circ + n \cdot 360^\circ$$

$$x = 131,4^\circ + n \cdot 360^\circ$$

3) $y = 10 - 10 \cdot \sin 2(x - 10^\circ)$

$$2 = \frac{360^\circ}{?} \Rightarrow ? = \frac{360^\circ}{2} = 180^\circ$$

a) perioden = 180°

b) 10° åt höger

c) 20

4) Perioden = $120^\circ \Rightarrow k = \frac{360^\circ}{120^\circ} = 3 \rightarrow A = 2,5$

Största värdet = 4

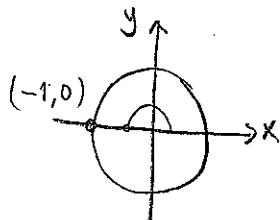
Minsta värdet = -1

$$\left. \begin{array}{l} \text{Största värdet} = 4 \\ \text{Minsta värdet} = -1 \end{array} \right\} \Rightarrow c = \frac{5}{2} = 2,5$$

$$y = 1,5 + 2,5 \cos 3x$$

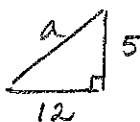
Svar: $y = \cancel{1,5 + 3 \cdot \cos x}$

5) $\cos(4x + 180^\circ) = \cos 4x \cdot \underbrace{\cos 180^\circ}_{-1} - \sin 4x \cdot \underbrace{\sin 180^\circ}_{=0} =$



$$= -\cos 4x$$

6) $\tan v = \frac{5}{12}$



$$a^2 = 25 + 144 = 169$$

$$a = 13$$

$$\Rightarrow \sin v = \frac{5}{13}$$

Svar: $\frac{5}{13}$

7) $\cos 2v = 2 \cdot \cos^2 v - 1 \Rightarrow 2 \cdot \left(\frac{8}{9}\right)^2 - 1 = 2 \cdot \frac{64}{81} - 1 = \frac{128}{81} - \frac{81}{81} =$

$$= \frac{47}{81}$$

Svar: $\frac{47}{81}$

8) $\sin(3x + 60^\circ) = -0,39$

$$0^\circ \leq x \leq 200^\circ$$

1) $3x + 60^\circ \approx -23^\circ + n \cdot 360^\circ$

$$3x = -83^\circ + n \cdot 360^\circ$$

$$x \approx -28^\circ + n \cdot 120^\circ \quad (1p)$$

$$n=1 \Rightarrow x = -28^\circ + 120^\circ = 92^\circ$$

$$(n=2 \Rightarrow x = -28^\circ + 240^\circ = 212^\circ)$$

2) $3x + 60^\circ \approx 180^\circ - (-23^\circ) + n \cdot 360^\circ$

$$3x + 60^\circ = 203^\circ + n \cdot 360^\circ$$

$$3x = 143^\circ + n \cdot 360^\circ$$

$$x \approx 48^\circ + n \cdot 120^\circ \quad (1p)$$

$$n=0: x = 48^\circ$$

$$n=1: x = 48^\circ + 120^\circ = 168^\circ$$

Svar: $x = 92^\circ, x = 48^\circ, x = 168^\circ$

(1p)

9) $\cos 2v = 4 \cdot \sin v \cdot \cos v$

$$\cos 2v = 2 \cdot \underbrace{2 \cdot \sin v \cdot \cos v}_{= \sin 2v} \quad (1p)$$

$$\cos 2v = 2 \cdot \sin 2v$$

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

$$\frac{1}{2} = \tan 2v \quad (1p)$$

$$2v \approx 26,6^\circ + n \cdot 180^\circ$$

$$v \approx 13,3^\circ + n \cdot 90^\circ \quad (1p)$$

$$10) \quad \sin 2x = 4 \cdot \cos x$$

$$2 \cdot \sin x \cdot \cos x = 4 \cdot \cos x$$

$$2 \cdot \sin x \cdot \cos x - 4 \cdot \cos x = 0 \quad (1p)$$

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

$$\cos x = 0$$

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

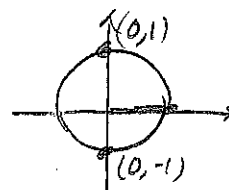
(+1p)

$$\sin x - 2 = 0$$

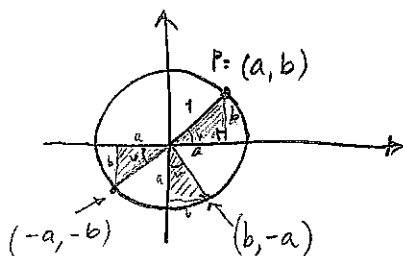
$$\sin x = 2$$

saknar lösning! (1p)

$$\text{Svar: } x = 90^\circ + n \cdot 180^\circ$$



11)



$$a) \text{ Svar: } (-a, -b) \quad (1p)$$

$$b) \text{ Svar: } (b, -a) \quad (1p)$$

$$12) \quad 5 \cdot \cos^2 x = 2 \cdot \sin x + 2$$

$$5(1 - \sin^2 x) = 2 \cdot \sin x + 2$$

$$5 - 5 \cdot \sin^2 x - 2 \cdot \sin x - 2 = 0$$

$$-5 \cdot \sin^2 x - 2 \cdot \sin x + 3 = 0 \quad (1p)$$

$$\sin^2 x + \frac{2}{5} \cdot \sin x - \frac{3}{5} = 0$$

Sätt $\sin x = t$:

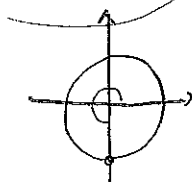
$$t^2 + \frac{2}{5} \cdot t - \frac{3}{5} = 0 \quad (1p)$$

$$t = -\frac{1}{5} \pm \sqrt{\frac{1}{25} + \frac{3}{5}} = -\frac{1}{5} \pm \sqrt{\frac{16}{25}}$$

$$t = -\frac{1}{5} \pm \frac{4}{5}$$

$$t_1 = -1$$

$$t_2 = \frac{3}{5}$$



$$\Delta \sin x = -1$$

$$\sin x = \frac{3}{5}$$

$$x = 270^\circ + n \cdot 360^\circ$$

$$1) x = 37^\circ + n \cdot 360^\circ$$

$$2) x = 143^\circ + n \cdot 360^\circ$$

$$\text{Svar: } x = 37^\circ + n \cdot 360^\circ$$

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

$$x = 270^\circ + n \cdot 360^\circ$$

(1p)

13)

$$3 \cdot \sin x + 4 \cdot \cos x = 4,3$$

Skrivs om på
formen $m \sin(x+v)$.

$$\sqrt{3^2 + 4^2} = 5$$

$$\tan v = \frac{4}{3}$$

$$v \approx 53,1^\circ$$

$$5 \cdot \sin(x + 53,1^\circ) = 4,3 \quad (2p)$$

$$\sin(x + 53,1^\circ) = \frac{4,3}{5}$$

$$1) \quad x + 53,1^\circ \approx 59,3^\circ + n \cdot 360^\circ$$

$$x \approx 6,2^\circ + n \cdot 360^\circ$$

$$2) \quad x + 53,1^\circ \approx 120,1^\circ + n \cdot 360^\circ$$

$$x \approx 67^\circ + n \cdot 360^\circ$$

(1p)

14) Visa att $\frac{1}{\sin x} = \frac{\sin x}{1 + \cos x} + \frac{1}{\tan x}$

$$H.v. = \frac{\sin x}{1 + \cos x} + \frac{\cos x}{\sin x} = \frac{\sin x \cdot \sin x}{(1 + \cos x) \cdot \sin x} + \frac{\cos x \cdot (1 + \cos x)}{\sin x (1 + \cos x)}$$

$$= \frac{\sin^2 x + \cos x + \cos^2 x}{\sin x (1 + \cos x)} = \frac{(1 + \cos x)}{\sin x (1 + \cos x)} = \frac{1}{\sin x} = V.L.$$

V.S.B.