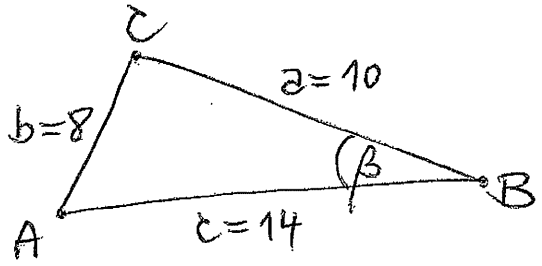
Lösningar till diagnosprov Ma3c kap 4
Trigonometri

① 

Cosinussatsen:

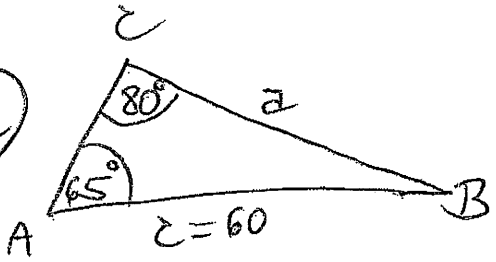
$$b^2 = a^2 + c^2 - 2ac \cdot \cos\beta$$

$$2ac \cdot \cos\beta = a^2 + c^2 - b^2$$

$$\cos\beta = \frac{10^2 + 14^2 - 64}{2 \cdot 10 \cdot 14}$$

$$\beta = \cos^{-1}\left(\frac{100 + 196 - 64}{280}\right)$$

$$\beta = 34^\circ$$

② 

$$B = 180^\circ - (65^\circ + 80^\circ)$$

$$B = 35^\circ$$

Sinussatsen:

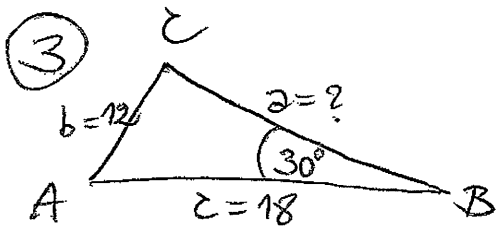
$$\frac{\sin A}{a} = \frac{\sin C}{c}$$

$$\frac{\sin 65^\circ}{a} = \frac{\sin 80^\circ}{60}$$

$$\frac{60 \cdot \sin 65^\circ}{\sin 80^\circ} = a$$

Areasatsen: $A = \frac{a \cdot c \cdot \sin B}{2} = \frac{60 \cdot \sin 65^\circ \cdot 60 \cdot \sin 35^\circ}{2 \cdot \sin 80^\circ}$

$$A = 950{,}14$$

③ 

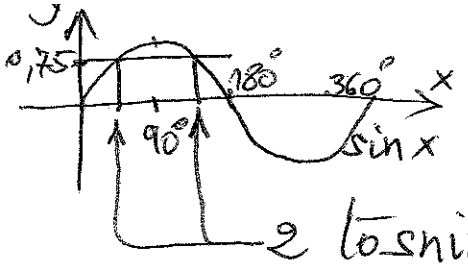
$$\sin B = \sin 30^\circ = \frac{1}{2}$$

Sinussatsen:

$$\frac{\sin C}{c} = \frac{\sin B}{b}$$

$$\sin C = \frac{18 \cdot \sin 30^\circ}{12} = \frac{\overset{3}{\cancel{18}} \cdot 1}{\underset{2}{\cancel{12}} \cdot 2}$$

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



2 lösningar: $C = \sin^{-1}(0{,}75)$

$$\begin{cases} C_1 = 48{,}5904^\circ \\ C_2 = 180^\circ - C_1 = 131{,}4096^\circ \end{cases}$$

$$\Downarrow$$

$A_1 = 180^\circ - 30^\circ - C_1 = 101{,}4096^\circ$

$A_2 = 180^\circ - 30^\circ - C_2 = 18{,}5904^\circ$

Sinussatsen: $\frac{\sin A}{a} = \frac{\sin B}{b}$

$$\frac{\sin 101{,}4096}{a_1} = \frac{1}{24}$$

$$24 \cdot \sin 101{,}4096^\circ = a_1$$

$$\underline{\underline{a_1 = 23{,}53}}$$

$24 \cdot \sin 18{,}5904^\circ = a_2$

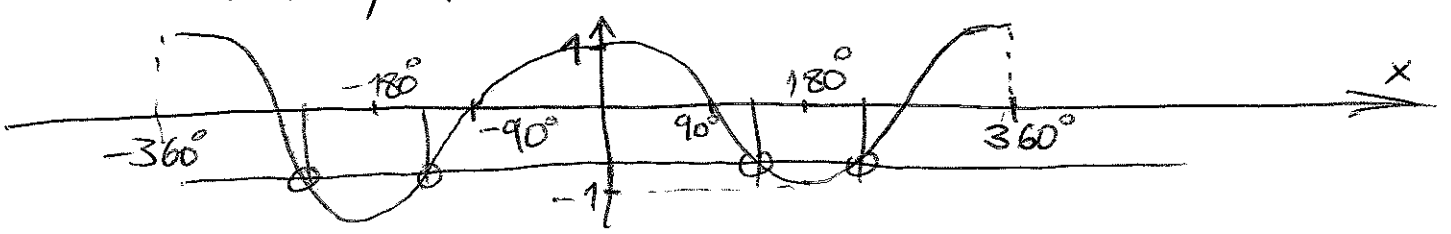
$$\underline{\underline{a_2 = 7{,}65}}$$

2 lösningar
2 svar
båda o.k.

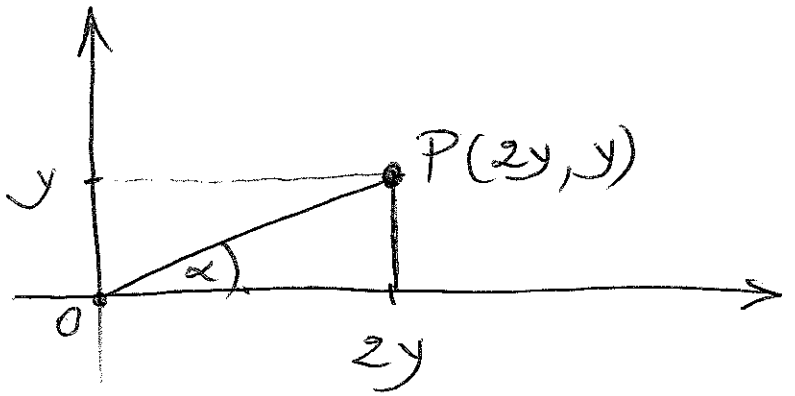
(4) $\cos v = -0{,}845$

$v = \cos^{-1}(-0{,}845) = 147{,}67^\circ$

Svar: $\begin{cases} 147{,}67^\circ + n \cdot 360^\circ & (n \text{ heltal}) \\ -147{,}67^\circ - n \cdot 360^\circ \end{cases}$



5



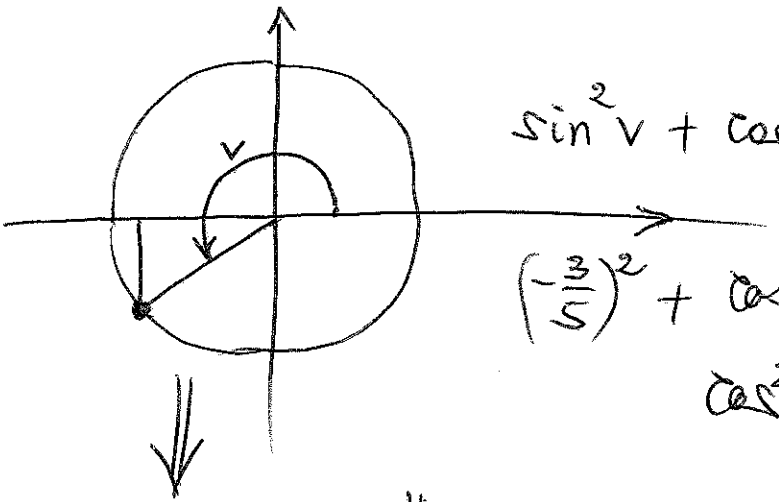
$$\tan\alpha = \frac{y}{2y}$$

$$\tan\alpha = \frac{1}{2}$$

$$\alpha = \tan^{-1}\left(\frac{1}{2}\right)$$

$$\underline{\alpha = 26{,}6^\circ}$$

6



$$\sin^2 v + \cos^2 v = 1$$

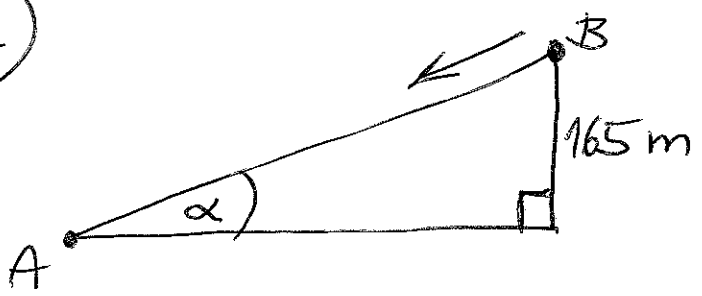
$$\left(-\frac{3}{5}\right)^2 + \cos^2 v = 1$$

$$\cos^2 v = 1 - \frac{9}{25} = \frac{16}{25}$$

$$\cos v = \pm\frac{4}{5}$$

$$\underline{\text{Svar: } \cos v = -\frac{4}{5}}$$

7



AB = nedfartens längd

$$67\ m/s = \frac{AB}{10\ s}$$

$$670\ m = AB$$

$$\sin\alpha = \frac{165\ m}{670\ m} = 0{,}2463$$

$$\alpha = \sin^{-1}(0{,}2463)$$

$$\underline{\alpha = 14^\circ}$$

8

$$\tan\left(\frac{x}{4}\right) = \frac{1}{2}$$

$$\frac{x}{4} = \tan^{-1}\left(\frac{1}{2}\right) = 26{,}565^\circ$$

$$x = 4 \cdot 26{,}565^\circ = 106{,}26^\circ$$

$\frac{x}{4} = 180^\circ$

$x = 4 \cdot 180^\circ$

$x = 720^\circ$

720°

$$\underline{\text{Svar: } 106^\circ + n \cdot \text{[illegible]}} \quad (n \text{ heltal})$$

(9) $14{,}4 \cdot \cos x + 6 \cdot \sin x = 0$

$6 \cdot \sin x = -14{,}4 \cdot \cos x \quad | \,/\cos x$

$6 \cdot \frac{\sin x}{\cos x} = -14{,}4 \cdot \frac{\cos x}{\cos x}$

$6 \cdot \tan x = -14{,}4$

$\tan x = -\frac{14{,}4}{6}$

$x = \tan^{-1}\left(-\frac{14{,}4}{6}\right)$

$x = -67{,}38^\circ$

Svar: $x = -67{,}4^\circ + n \cdot 360$

eller ($n=1$) $x = 292{,}6^\circ + n \cdot 360$

(10) $f(x) = 6x^5 + 5x^4 + 4x$

$F(x) = 6 \cdot \frac{x^6}{6} + 5 \cdot \frac{x^5}{5} + 4 \cdot \frac{x^2}{2} = + C$

$= x^6 + x^5 + 2x^2 + C$

Svar: $G(r) = \frac{\pi}{3}r^3 + \frac{\pi}{2}r^2 + \frac{\pi}{6}$

(11) $g(r) = \pi \cdot r^2 + \pi \cdot r$

$G(r) = \frac{\pi}{3}r^3 + \frac{\pi}{2} \cdot r^2 + C$

$G(1) = \frac{\pi}{3} + \frac{\pi}{2} + C = \pi$

$\frac{2\pi}{6} + \frac{3\pi}{6} + C = \frac{6\pi}{6} \quad | \cdot 6$

$2\pi + 3\pi + 6C = 6\pi$

$6C = 6\pi - 5\pi$

$C = \pi/6$

(12) $A = \int_{-6}^{0} \left(\frac{x^3}{6} + x^2\right) dx = \left[\frac{x^4}{24} + \frac{x^3}{3}\right]_{-6}^{0} =$

Primitiv fkt.

$$= \frac{0^4}{24} + \frac{0^3}{3} - \left(\frac{(-6)^4}{24} + \frac{(-6)^3}{3}\right) =$$

$$= 0 - \frac{6^4}{24} + \frac{6^3}{3} = \underline{\underline{18}}$$

(13)

$$\int_{0}^{4} (x^2 - 6x + 2) - (-x^2 + 2x + 2)\, dx =$$

$$= \int_{0}^{4} (2x^2 - 8x)\, dx = \left[2 \cdot \frac{x^3}{3} - 8 \cdot \frac{x^2}{2}\right]_{0}^{4} =$$

$$= \left[\frac{2}{3}x^3 - 4x^2\right]_{0}^{4} = \frac{2}{3} \cdot 4^3 - 4 \cdot 4^2 - 0 =$$

$$= 4^3 \cdot \left(\frac{2}{3} - 1\right) = -\frac{64}{3} = -21\frac{1}{3}$$

$$A = \left|-21\tfrac{1}{3}\right| = \underline{\underline{21\tfrac{1}{3}}}$$