(ARK 4)

2) b) $f(x) = 3(\sin x)^3$

$f'(x) = 3 \cdot 3(\sin x)^2 \cdot \cos x$

$f'(x) = 9(\sin x)^2 \cdot \cos x$

	$-\frac{\pi}{2}$	0	$\frac{\pi}{2}$	π	$\frac{3\pi}{2}$
9					
$(\sin x)^2$		0		0	
$\cos x$	0		0		0
$f'(x)$	0	0	0	0	0
	BUNN	TERRASSE	TOPP	TERRASSE	BUNN

Toppunkt $f\left(\frac{\pi}{2}\right) = 3\left(\sin\frac{\pi}{2}\right)^3 = 3 \cdot 1^3 = 3$

Terrasse $f(0) = 3 \cdot (\sin 0)^3 = 3 \cdot 0 = 0$

$f(\pi) = 3(\sin\pi)^3 = 3 \cdot 0^3 = 0$

Bunn $f\left(-\frac{\pi}{2}\right) = 3\left(\sin\left(-\frac{\pi}{2}\right)\right)^3 = 3 \cdot (-1)^3 = -3$ $\quad f\left(\frac{3\pi}{2}\right) = 3\left(\sin\left(\frac{3\pi}{2}\right)\right)^3 = 3 \cdot (-1)^3 = -3$

Toppunkt : $\left(\frac{\pi}{2}, 3\right)$ Bunnpunkt: $\left(-\frac{\pi}{2}, -3\right) \vee \left(\frac{3\pi}{2}, -3\right)$ Terrassep $(0,0) \vee (\pi, 0)$

c) $\int 3(\sin x)^3\,dx = a(\cos x)^3 + b\cos x + c$

$\int 3(\sin x)^3\,dx = 1(\cos x)^3 - 3\cos x + c$

Vi deriverer høyresiden:

$3(\cos x)^2 \cdot (-\sin x) - 3(-\sin x)$

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

$= 3\sin x(-\cos^2 x + 1)$

$= 3\sin x \cdot \sin^2 x$

$= 3\sin^3 x$

bruker
$\sin^2 x + \cos^2 x = 1$
$\sin^2 x = 1 - \cos^2 x$

d) $A = \int_0^{\pi} 3(\sin x)^3\,dx = \left[(\cos x)^3 - 3\cos x\right]_0^{\pi}$ eller bruk kalkulator

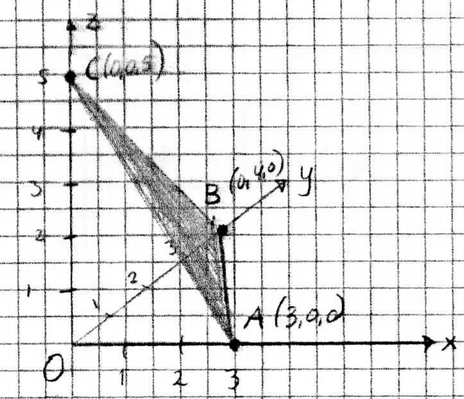
$= (\cos\pi)^3 - 3\cos\pi - \left((\cos 0)^3 - 3\cos 0\right)$

$A = (-1)^3 - 3(-1) - (1^3 - 3 \cdot 1)$

$A = -1 + 4 - 1 - 3$

$\underline{\underline{A = 4}}$

3) a) $O(0,0,0)$ $A(3,0,0)$ $B(0,4,0)$ $C(0,0,5)$



$\vec{AB} = [0-3, 4-0, 0-0]$

$\vec{AB} = [-3, 4, 0]$

$|\vec{AB}| = \sqrt{(-3)^2 + 4^2 + 0^2} = \sqrt{9+16} = \sqrt{25} = 5$

Avstanden fra A til B er 5

b) $\vec{AC} = [0-3, 0-0, 5-0]$

$\vec{AC} = [-3, 0, 5]$

$\vec{AB} \times \vec{AC} = [-3, 4, 0] \times [-3, 0, 5] = \begin{vmatrix} \vec{e_x} & \vec{e_y} & \vec{e_z} \\ -3 & 4 & 0 \\ -3 & 0 & 5 \end{vmatrix}$

$= \vec{e_x}\begin{vmatrix} 4 & 0 \\ 0 & 5 \end{vmatrix} - \vec{e_y}\begin{vmatrix} -3 & 0 \\ -3 & 5 \end{vmatrix} + \vec{e_z}\begin{vmatrix} -3 & 4 \\ -3 & 0 \end{vmatrix}$

$= \vec{e_x}(20-0) - \vec{e_y}(-15-0) + \vec{e_z}(0-(-12))$

$= 20\vec{e_x} + 15\vec{e_y} + 12\vec{e_z}$

$= [20, 15, 12]$