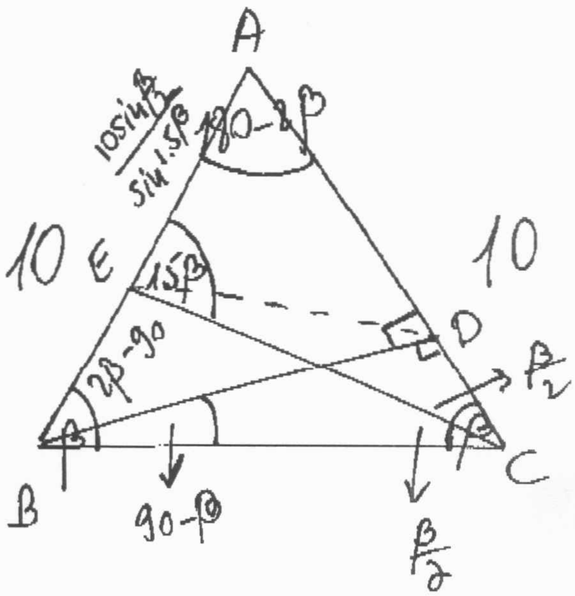


ΔAEC: (א

$$\frac{AE}{\sin\frac{\beta}{2}} = \frac{10}{\sin 1.5\beta}$$

$$\Downarrow$$

$$\boxed{AE = \frac{10\sin\frac{\beta}{2}}{\sin 1.5\beta}}$$

ΔABD: (ב

$$\frac{AD}{\sin(2\beta-90)} = \frac{10}{\underbrace{\sin 90}_{1}}$$

$$\Rightarrow \quad AD = 10\sin(2\beta-90) = -10\cos 2\beta$$

$$\Rightarrow S_{\Delta AED} = \frac{AE\cdot AD\cdot \sin(180-2\beta)}{2} = \frac{\frac{10\sin\frac{\beta}{2}}{\sin 1.5\beta}\cdot -10\cos 2\beta \sin 2\beta}{2}$$

$$\Rightarrow \boxed{S_{\Delta AED} = \frac{-50\sin\frac{\beta}{2}\cos 2\beta \sin 2\beta}{\sin 1.5\beta}}$$

$\sphericalangle DBC = \frac{\beta}{4}$:נתון (ג

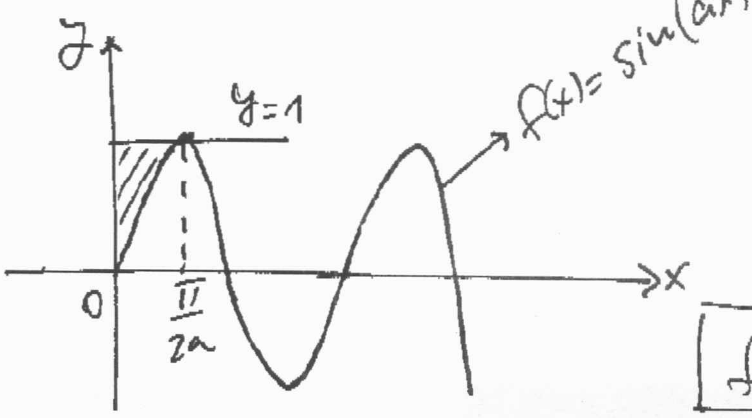
$$\sphericalangle DBC = 90-\beta \underset{\uparrow}{=} \frac{\beta}{4} \Rightarrow 90^\circ = 1.25\beta \Rightarrow \boxed{\beta = 72^\circ}$$

נתון

$$\Rightarrow S_{\Delta AED} = \frac{-50\sin 36^\circ \cos 144^\circ \sin 144^\circ}{\sin 108^\circ} = 14.69$$

יח"ר

$x\geq 0$, $a>0$, $f(x)=\sin(ax)$ (2)



$$\boxed{f'(x)=a\cos(ax)}$$ (1) (א)

$f'(x)=0 \Rightarrow a\cos(ax)=0 \,/:a \Rightarrow \cos(ax)=0 \quad (\alpha=90^\circ)$

$ax=-90+360k$ $\qquad$ $ax=90+360k$

$x=\frac{90}{a}=\frac{\pi/2}{a}$ $\Leftarrow$ $x_2=\frac{-90}{a}+\frac{360k}{a}$ $\qquad$ $x_1=\frac{90}{a}+\frac{360k}{a}$

$\Rightarrow x=\frac{\pi}{2a} \Rightarrow y=\sin\left(a\cdot\frac{\pi}{2a}\right)=\sin\left(\frac{\pi}{2}\right)=1$

$\Rightarrow \boxed{\max\left(\frac{\pi}{2a},1\right)}$

(2) משיק אופקי: $\boxed{y=1}$

(ג) נתון: $S=\frac{\pi-2}{4}$ צ"ל: $a=2$.

$$S=\int_0^{\frac{\pi}{2a}}[1-\sin(ax)]\,dx = x-\frac{-\cos(ax)}{a}\Big|_0^{\frac{\pi}{2a}} = x+\frac{\cos(ax)}{a}\Big|_0^{\frac{\pi}{2a}}$$

$$S=\frac{\pi}{2a}+\frac{\cos\left(a\cdot\frac{\pi}{2a}\right)}{a}-\left[0+\frac{\cos(0)}{a}\right]=\frac{\pi}{2a}+0-\left[0+\frac{1}{a}\right]$$

$$S=\frac{\pi}{2a}-\frac{1}{a}\underset{\text{נתון}}{=}\frac{\pi-2}{4}\ \Big/\cdot 4a \Rightarrow 2\pi-4=a\pi-2a$$

$$\Rightarrow 2(\cancel{\pi-2})=a(\cancel{\pi-2}) \Rightarrow \boxed{a=2}$$

(3)

נתון: $f(x)=\dfrac{x^2-ax+2}{x-1}$

קיצון $X=0$

(א)

$$f'(x)=\frac{(2x-a)(x-1)-(x^2-ax+2)\cdot 1}{(x-1)^2}$$

$$f'(x)=\frac{2x^2-2x-\cancel{ax}+a-x^2+\cancel{ax}-2}{(x-1)^2}=\frac{x^2-2x+a-2}{(x-1)^2}$$

$\underline{f'(0)=0}$

$$\Rightarrow \frac{a-2}{(0-1)^2}=0 \Rightarrow \boxed{a=2}$$

(ב)

$$f(x)=\frac{x^2-2x+2}{x-1}$$

(1) $\{\underline{x\neq 1}\}$

(2) חיתוך עם ציר x: $y=0 \Leftarrow$ $x^2-2x+2=0 \Leftarrow$

אין פתרון $\Leftarrow$ אין חיתוך עם ציר x!

חיתוך עם ציר y: $x=0 \Leftarrow$ $y=-2 \Leftarrow$ $\boxed{(0,-2)}$

(3)

$$\boxed{f'(x)=\frac{x^2-2x}{(x-1)^2}}$$

$$f'(x)=0 \Rightarrow x^2-2x=0 \Rightarrow x_1=0,\ x_2=2$$

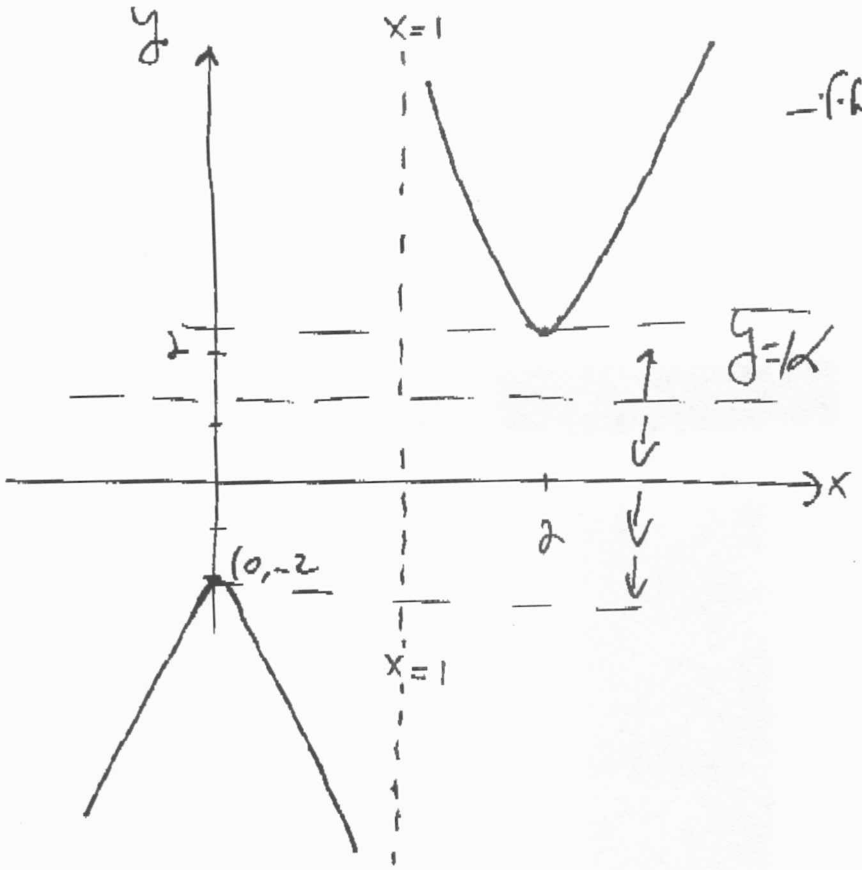
בעזרת y'':

$y''=2x-2$ (או) $y''(0)<0 \Rightarrow max,\ y''(2)>0 \Rightarrow min$

או ע"י טבלת עליה-ירידה:

x	+	0	−	1	−	2	+
y'	↗	0	↘	////	↘	0	↗
y		−2				2	
		max				min	

$f(0)=-2$, $f(2)=2 \Rightarrow \boxed{[\max(0,-2),\ \min(2,2)]}$



2) [illegible]

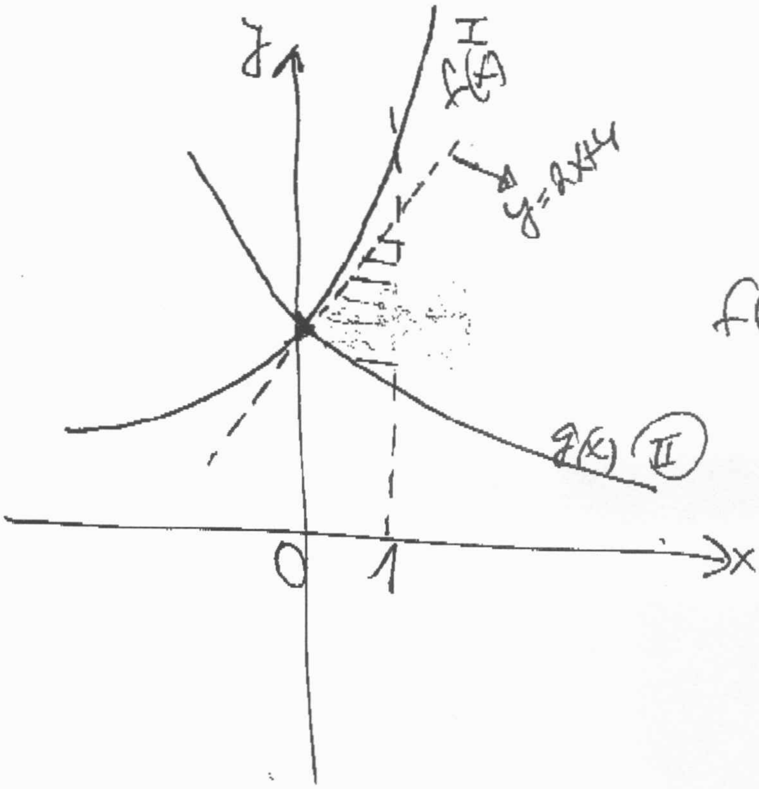
$x<1$. [illegible]

3) [illegible]

$-2<k<2$

$$f(x)=e^{2x}+3$$ (4)

$$g(x)=3e^{-2x}+1$$



ב $f(1)=10.38$, $g(1)=1.4$

$f(1)>g(1)$

לכן $f(x)$ הוא גרף פונקציה I ; $g(x)$ הוא גרף פונקציה II.

ג

$\boxed{A(0,4)}$ ⇐ $y=e^{0}+3=4$ ⇐ $\underset{A}{x=0}$

$f'(x)=2e^{2x} \Rightarrow m=2e^{0} \Rightarrow \boxed{m=2}$

$y-4=2(x-0) \Rightarrow \boxed{y=2x+4}$ משוואת המשיק:

הפרש פונקציות:

$$2x+4-\left(3e^{-2x}+1\right)$$

$$\underline{\underline{2x+3-3e^{-2x}}}$$

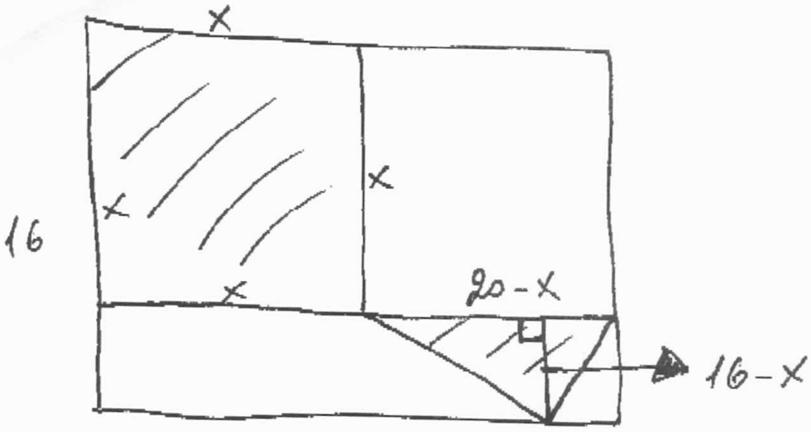
פונקצית השטח:

חישוב השטח:

$$S=\int_0^1\left(2x+3-3e^{-2x}\right)dx=x^2+3x-\frac{3e^{-2x}}{-2}\Bigg|_0^1$$

$$=x^2+3x+\frac{3e^{-2x}}{2}\Bigg|_0^1=1+3+\frac{3e^{-2}}{2}-\left[0+0+\frac{3e^{0}}{2}\right]$$

$$=\underline{\underline{2.703}}$$



(תשובה) $f(x) = x^2 + \frac{(20-x)(16-x)}{2} = x^2 + \frac{320-20x-16x+x^2}{2}$

$f(x) = \frac{2x^2+320-20x-16x+x^2}{2} = \frac{3x^2-36x+320}{2}$

$f'(x) = \frac{6x-36}{2}$

$f'(x)=0 \Rightarrow 6x-36=0 \Rightarrow \boxed{x=6}$ ס"מ

$f''(x) = \frac{6}{2} > 0 \Rightarrow \min$

[illegible]
[illegible]

$S_\Delta = \frac{(20-x)\cdot(16-x)}{2} = \frac{14\cdot 10}{2} = 70$ סמ"ר