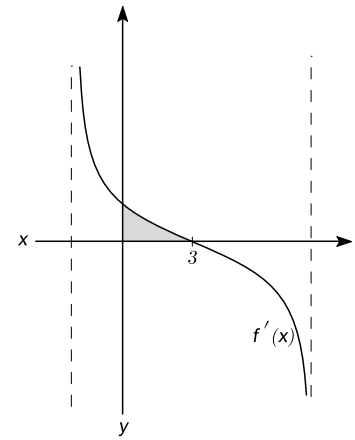
7. א. (1)

x	?		3		?
f'		+	0	−	
f		↗	max	↘	

על-פי הציור:

$\Rightarrow$ $\mathbf{x_{max} = 3}$



(2)

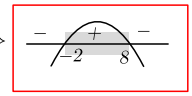
$f(x) = \sqrt{-x^2 + bx + 16}$, $f'(x) = \frac{-2x+b}{2\sqrt{-x^2+bx+16}}$

$f'(3) = 0 \quad \Rightarrow \quad -2\cdot 3 + b = 0 \quad \Rightarrow \quad \mathbf{b = 6}$

ב.

$\mathbf{f(x) = \sqrt{-x^2 + 6x + 16}}$

$-x^2 + 6x + 16 \geq 0$, $x_{1,2} = \frac{-6 \pm 10}{-2} = 3 \mp 5 \quad \Rightarrow \quad x_1 = -2$, $x_2 = 8$

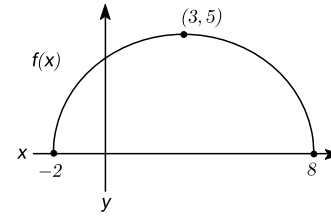
$a = -1 < 0 \quad \Rightarrow$  $\Rightarrow \quad \mathbf{-2 \leq x \leq 8}$

ג.

$f(-2) = f(8) = 0$, $f(3) = \sqrt{-9 + 18 + 16} = 5$

$\Rightarrow$ $\mathbf{min_{ep}(-2,0)}$, $\mathbf{max\ (3,5)}$, $\mathbf{min_{ep}(8,0)}$

ד.



ה.

$S = \int_0^3 f'(x)\,dx = f(x)\Big|_0^3 = f(3) - f(0) = 5 - 4 \quad \Rightarrow \quad \mathbf{S = 1}$ **(יחידה ריבועית)**

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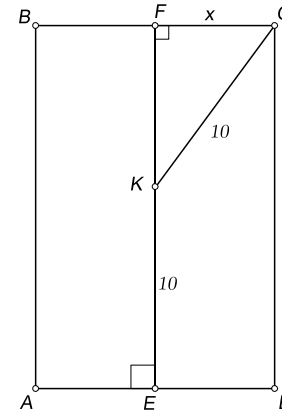
8. א.

$KFC = 90^\circ$ $\Rightarrow$ $\mathbf{FK = \sqrt{100 - x^2}\,cm}$

מתחלפות במקבילים — פיתגורס

ב.



$AB = EF = EK + KF = 10 + \sqrt{100 - X^2}$

$2AB + 2BC = f(x) = 2(10 + \sqrt{100 - x^2}) + 2\cdot 2x$

$f(x) = 4x + 2\sqrt{100 - x^2} + 20$

$f'(x) = 4 + 2\cdot\frac{-2x}{2\sqrt{100-x^2}} = \boxed{4 - \frac{2x}{\sqrt{100-x^2}}} \ ?\ 0$

$\frac{2x}{\sqrt{100-x^2}} = 4 \quad \Rightarrow \quad 4x^2 = 16(100 - x^2) = 1600 - 16x^2$

$20x^2 = 1600 \quad \Rightarrow \quad x^2 = 80 \quad \Rightarrow \quad x = \sqrt{80}$

x	0		$\sqrt{80}$		10
f'		+	0	−	
f		↗	max $(\sqrt{})$	↘	

$\Rightarrow$ $BC = 2x = 2\sqrt{80} = 2\sqrt{16\cdot 5} = 2\cdot 4\cdot\sqrt{5}$

$\Rightarrow$ $\mathbf{BC = 8\sqrt{5} = 17.89_{cm}}$