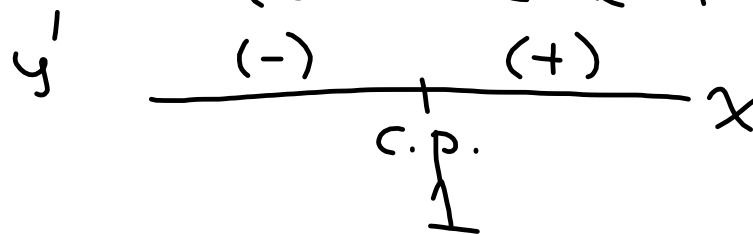


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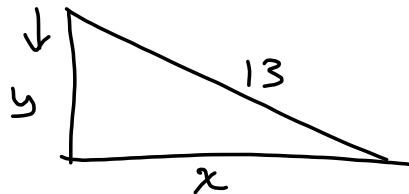
$$y = \begin{cases} 4 - 2x, & x \leq 1 \\ x + 1, & x > 1 \end{cases}$$

$$y' = \begin{cases} -2, & x \leq 1 \\ 1, & x > 1 \end{cases}$$

(a) critical point of y :
corner @ $x = 1$



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(a) when $x = 12$, find dy/dt

$$13^2 = x^2 + y^2$$

$$0 = 2x \frac{dx}{dt} + 2y \frac{dy}{dt}$$

$$\frac{dx}{dt} = 5 \quad x = 12$$

$$0 = 12 \cdot 5 + 5 \cdot \frac{dy}{dt}$$

$$\frac{dy}{dt} = \frac{-60}{5} = -12$$

(b) area of Δ

$$A = \frac{1}{2} \cdot x \cdot y$$

$$\frac{dA}{dt} = \frac{1}{2} \left(y \frac{dx}{dt} + x \frac{dy}{dt} \right)$$

$$= \frac{1}{2} (5 \cdot 5 + 12 \cdot (-12))$$

$$= \frac{1}{2} (25 - 144)$$

$$= \frac{1}{2} (-119)$$

$$= -59.5 \quad \frac{\text{sq something}}{\text{something}}$$

$$(c) \quad \frac{d\theta}{dt} \quad \sin \theta = \frac{y}{13}$$

$$\cos \theta \frac{d\theta}{dt} = \frac{1}{13} \frac{dy}{dt}$$

$$\frac{12}{13} \frac{d\theta}{dt} = \frac{1}{13} (-12)$$

$$\frac{d\theta}{dt} = -1 \text{ rad/}_-$$