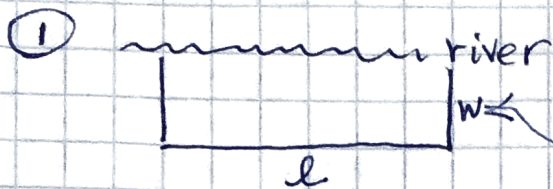


108 Sample Problems - Set Two KEY



$$l + 2w = 1700$$

$$2w = 1700 - l$$

$$w = \frac{1700 - l}{2}$$

$$A(l) = l * \left(\frac{1700 - l}{2} \right) = \frac{1700l - l^2}{2}$$

$$A(l) = 850l - \frac{1}{2}l^2 \text{ on } [0, 1700]$$

$$A'(l) = 850 - \frac{1}{2}(2l)$$

$$A'(l) = 850 - l = 0$$

iff $l = 850$

l	$A(l)$
0	0
850	$(850)(425) = 361250$
1700	0

850' x 425'



$$A(x) = x \cdot \frac{1}{x} = 1$$

any number between 1 and 4 creates rectangle of area 1.

③ $v(t) = t \cos(t) - \ln(t+2) \quad 0 \leq t \leq 10$

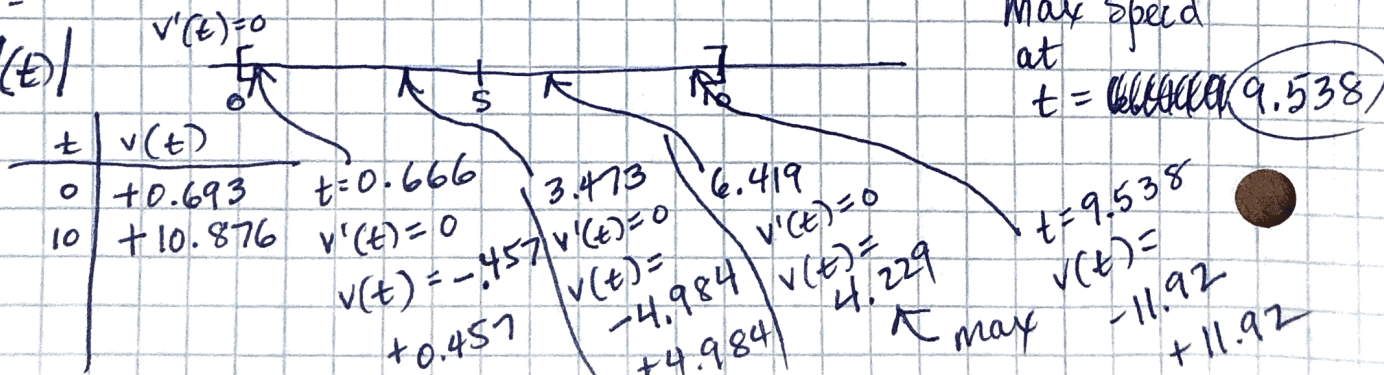
$$v'(t) = t(-\sin(t)) + \cos(t) - \frac{1}{t+2} \quad (1)$$

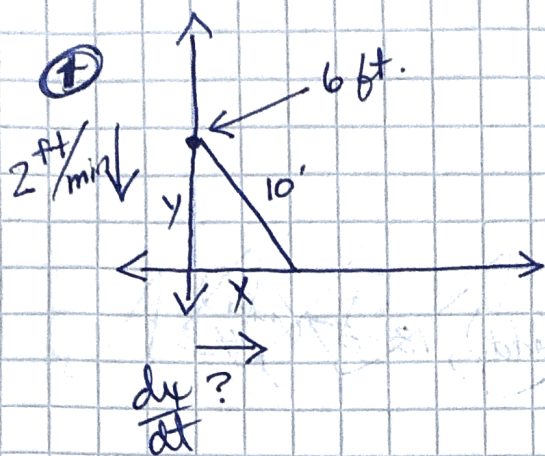
$$v'(t) = -t \sin(t) + \cos(t) - \frac{1}{t+2} = 0$$

iff $t =$

Speed =

$|v(t)|$





$$x^2 + y^2 = 10^2$$

$$x^2 + y^2 = 100$$

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

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

$$\frac{dx}{dt} = - \frac{y \cdot \frac{dy}{dt}}{x}$$

When $y=6$ $x^2 + 6^2 = 10^2$
 $x=8$ $x^2 = 100 - 36$
 $\frac{dy}{dt} = -2$ $x^2 = 64$
 $x = \pm 8$

$$\frac{dx}{dt} = - \frac{6(-2)}{8} = \frac{12}{8} = \frac{3}{2} \text{ ft/min}$$

1.5 ft/min

② $\frac{dV}{dt} \Big|_{t=0} = \frac{\pi}{3} (3h^2) \cdot \frac{dh}{dt} \Big|_{t=0}$ by Chain Rule

$h'(0)$ or $2 - \frac{24e^0}{0+4}$ or $2 - 6 = -4$

$(\pi h^2) (-4)$

↑
25

$\pi (25)^2 (-4)$

$\pi (625) (-4)$

$-2500\pi \text{ m}^3/\text{hr}$