Antidifferentiation and Rectilinear Motion

Time to ground? $s(t) = 0$

Vel at impact? $s(t) = 0 \rightarrow t$ $v(t) =$

Time to reach max ht? $v(t) = 0$

Find max ht? $v(t) = 0 \Rightarrow t =$ $s(t) =$

Previously...

$s(t) =$

$v(t) =$

Now...

At $t = 0$

$s =$ ___

$v =$ ___

$a =$ ___ → given as funct.
→ known constant

$a(t) = -32$

or

$a(t) = -9.8$

$a(t)$

↓

$v(t)$

↓

$s(x) =$

Part straight line and $a(t) = 6t + 4$.

If initial vel is -6 cm/s and initial position is 9 cm, find the position function.

$t = 0$

$s = 9$

$v = -6$

$a(t) = 6t + 4$

$a(t) = 6t + 4$

$v(t) = 3t^2 + 4t + C$

$-6 = C$

$\boxed{v(t) = 3t^2 + 4t - 6}$

$s(t) = t^3 + 2t^2 - 6t + D$

$9 = D$

$\boxed{s(t) = t^3 + 2t^2 - 6t + 9}$

Ball thrown vert upward at 48 ft/s. from the edge of a cliff 432 ft high. Find max ht ball reaches & vel when it hits the ground.

$t = 0$

$s = 432$

$v = 48$

$a(t) = -32$

$a(t) = -32$

$v(t) = -32t + C$

$48 = C$

$\boxed{v(t) = -32t + 48}$

$s(t) = -16t^2 + 48t + D$

$432 = D$

$\boxed{s(t) = -16t^2 + 48t + 432}$

Max ht

$v(t) = 0 \rightarrow t = \frac{3}{2}$

$s\left(\frac{3}{2}\right) = 468$

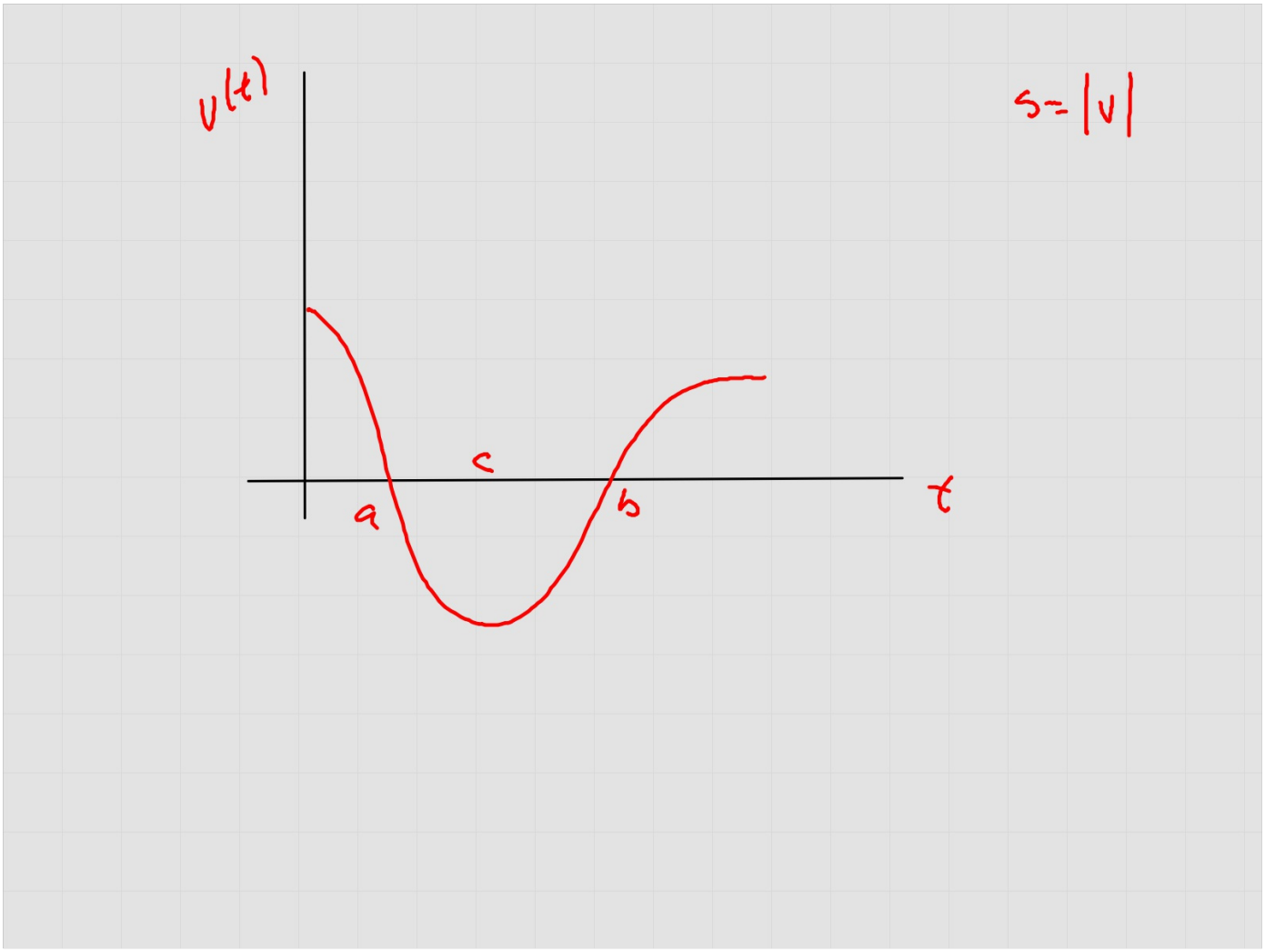
$\therefore$ 468 ft.

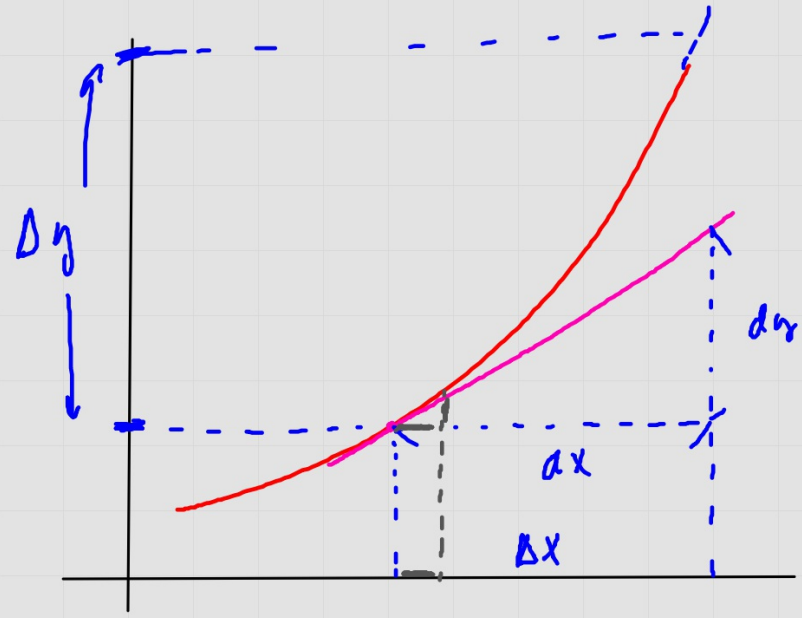
Vel at ground

$s(t) = 0 \rightarrow t = -3.908$ & $t = 6.908$

$v(6.908) = -173.066$

$\therefore -173.066$ ft/sec down.


v(t)
s = |v|
a
c
b
t



$$f'(x) = \frac{dy}{dx}$$

$$\frac{d^2y}{dx^2}$$

$$\frac{dy}{dx} = x + 2$$

$$\int dy = \int (x+2)\,dx$$

$$y = \frac{1}{2}x^2 + 2x + C$$