

Ex $s(t) = 100 - 16t^2$

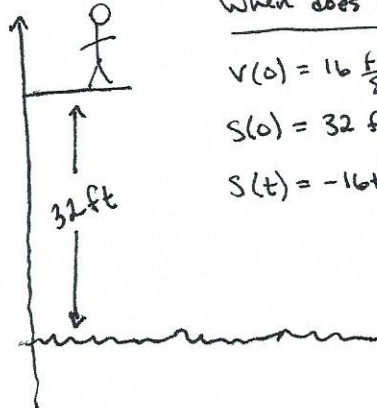
$$\frac{\Delta s}{\Delta t} = \frac{100 - 16(1.1)^2 - 100 + 16(1)^2}{1.1 - 1} = \text{avg vel}$$

$$v(t) = s'(t) = -32t = \text{inst. vel}$$

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When does the diver hit the water? What is the velocity at impact?

Ex



$$v(0) = 16 \frac{\text{ft}}{\text{sec}}$$

$$s(0) = 32 \text{ ft}$$

$$s(t) = -16t^2 + 16t + 32$$

a) b)

$$a) -16t^2 + 16t + 32 = 0$$

$$-16(t^2 - t - 2) = 0$$

$$-16(t-2)(t+1) = 0$$

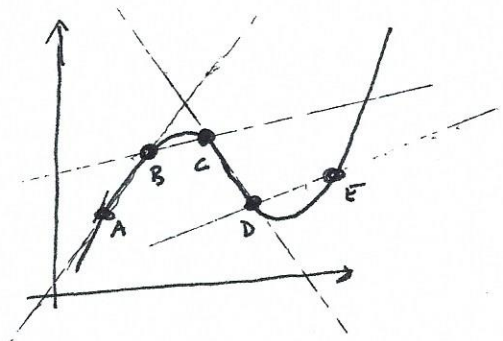
$t = 2, -1 \rightarrow t$ must be positive

\Rightarrow The diver hits the water at $t = 2$ s

$$b) v(t) = s'(t) = -32t + 16$$

$$v(t=2) = -32(2) + 16 = -64 + 16 = -48 \frac{\text{ft}}{\text{s}}$$

$$\Rightarrow \text{Speed} = |v| = \left| -48 \frac{\text{ft}}{\text{sec}} \right| = 48 \frac{\text{ft}}{\text{sec}}$$



a) average rate of change between consecutive points is greatest for AB

b) instantaneous rate of change greatest at E