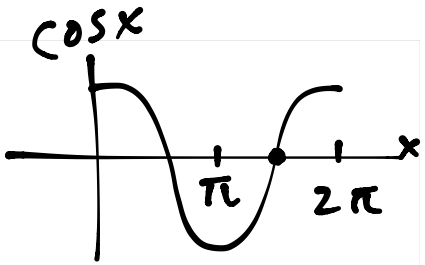
Good afternoon: warm up in notes

$$\int_{-\frac{3\pi}{2}}^{\frac{3\pi}{2}} \sin x \, dx = \left[-\cos x \right]_{-\frac{3\pi}{2}}^{\frac{3\pi}{2}}$$

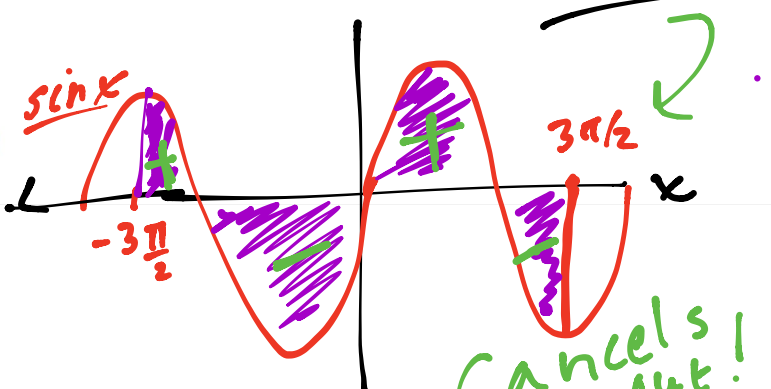
$$\left[-\cos(3\pi/2) \right] - \left[-\cos(-3\pi/2) \right]$$

$$0 - 0 = 0$$



Why?

reminder:
assessment is Friday



Visibly Random Grouping

HW answers...aren't needed! just check with a calculator

Questions on any in particular?

18) $\int_1^8 \sqrt{\frac{2}{x}}\,dx \Rightarrow \int_1^8 \frac{\sqrt{2}}{\sqrt{x}}\,dx \rightarrow \sqrt{2}\int_1^8 \frac{1}{\sqrt{x}}\,dx$

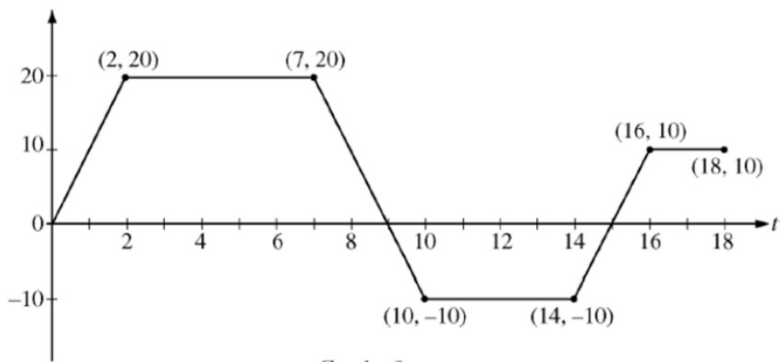
$\sqrt{2}\int_1^8 x^{-1/2}\,dx \longleftarrow \sqrt{2}\left[2x^{1/2}\right]_1^8$

$\sqrt{2}\left[2\sqrt{8} - 2\sqrt{1}\right]$

$\sqrt{2}\left[2\sqrt{8} - 2\right] \Rightarrow 2\sqrt{16} - 2\sqrt{2}$

$8 - 2\sqrt{2}$

2010b BC4
no calc



Graph of v

A squirrel starts at building A at time $t = 0$ and travels along a straight, horizontal wire connected to building B. For $0 \le t \le 18$, the squirrel's velocity is modeled by the piecewise-linear function defined by the graph above.

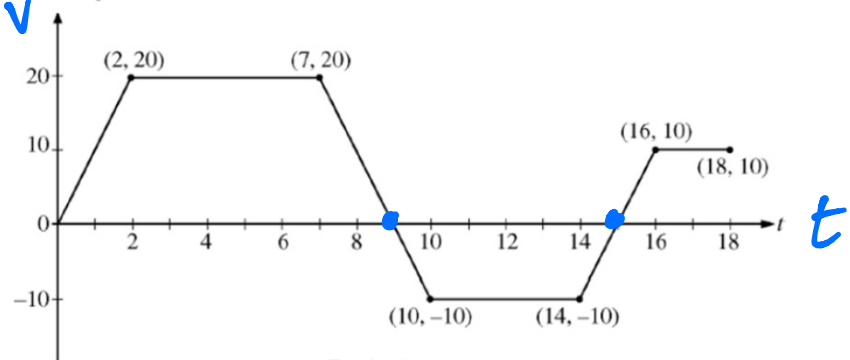
(a) At what times in the interval $0 < t < 18$, if any, does the squirrel change direction? Give a reason for your answer.

(b) At what time in the interval $0 \le t \le 18$ is the squirrel farthest from building A ? How far from building A is the squirrel at that time?

(c) Find the total distance the squirrel travels during the time interval $0 \le t \le 18$.

(d) Write expressions for the squirrel's acceleration $a(t)$, velocity $v(t)$, and distance $x(t)$ from building A that are valid for the time interval $7 < t < 10$.

(a) At what times in the interval $0 < t < 18$, if any, does the squirrel change direction? Give a reason for your answer.

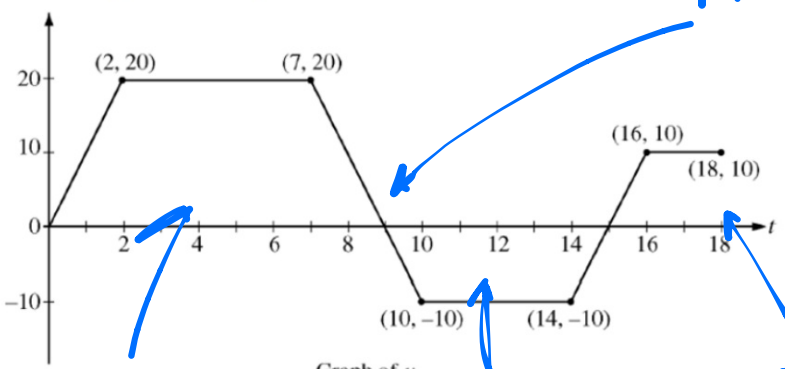


Graph of v

a.) @ $t = 9$, $t = 15$ b/c

$v(t)$ changes sign

(b) At what time in the interval $0 \le t \le 18$ is the squirrel farthest from building A ? How far from building A is the squirrel at that time?



Graph of v

"max"

fwd motion

backwards motion

fwd motion... but not as much as backwards!

b) @ $t = 9$.

??? don't have $x(t)$..

$$\int_0^9 v(t)\,dt = x(9) - x(0)$$

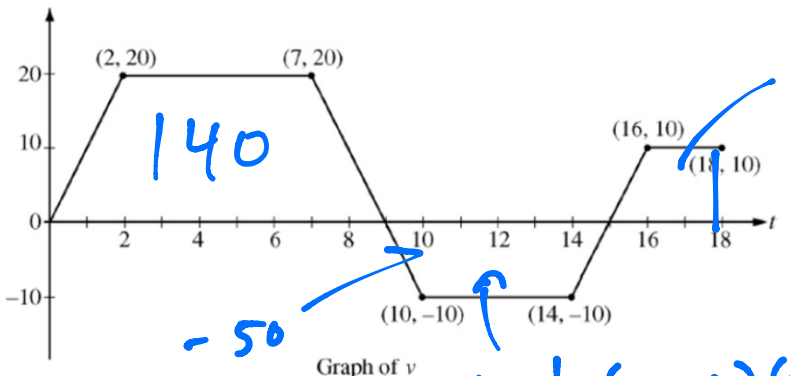
↳ Area!

$A = \frac{1}{2}(5+9)(20)$

$7 \cdot 20 = 140$

factor the backwards motion in...

(c) Find the total distance the squirrel travels during the time interval $0 \le t \le 18$.



Graph of v

140

$A = \frac{1}{2}(2+3)(10)$

$(2.5)(10)$

$= 25$

-50

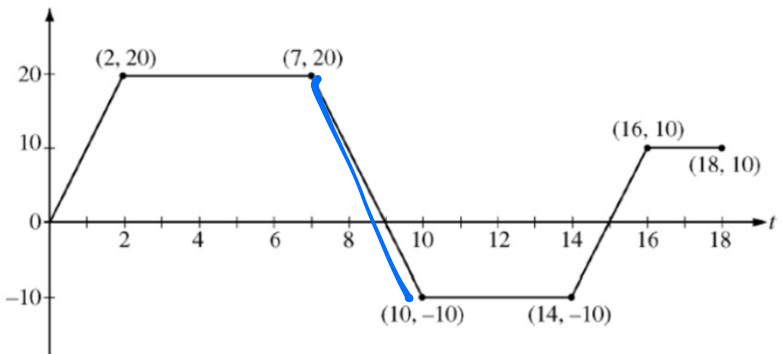
$A = \frac{1}{2}(4+6)(10)$

$(5)(10)$

50

$140 + 50 + 25 = 215$

(d) Write expressions for the squirrel's acceleration $a(t)$, velocity $v(t)$, and distance $x(t)$ from building A that are valid for the time interval $7 < t < 10$.



Graph of v

$\frac{d}{dt}\begin{pmatrix} p \\ v \\ a \end{pmatrix} \int dt$

$a(t) = ?$

Slope of $v(t)$: $\frac{\Delta y}{\Delta x} = \frac{-30}{3} = -10 = a(t)$

$v(t) = ?$ Eq of line. Slope is -10. use $(9, 0)$ as point

$y - 0 = -10(x - 9)$

$y = -10x + 90 \Rightarrow v(t) = -10t + 90$

$x(t)$ ↓ next pg.

$x(t) = ?$

$\int v(t)\,dt \Rightarrow \int -10t + 90\,dt$

$x(t) = -5t^2 + 90t + C$

To Find C ... Need a fixed point in $[7,10]$.

Oh! Part b! @ $t=9$, my dude traveled 140!!

$x(9) = 140$

$x(9) = 140 = -5(9)^2 + 90(9) + C$ (9 · 10)

$140 = -5(81) + 10(81) + C$

$140 = 5(81) + C$

$140 - 5(81) = C$

$-265 = C$

$x(t) = -5t^2 + 90t - 265$