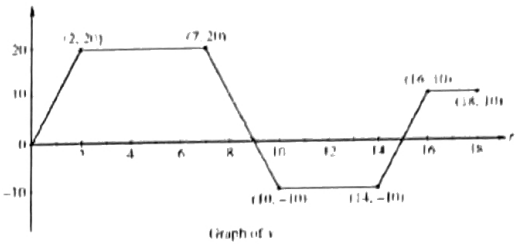
NAME James Dig
AP Calculus

DATE _____
FRQ #23

Graph

A squirrel starts at building A at time $t = 0$ and travels along a straight 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.



Graph of v

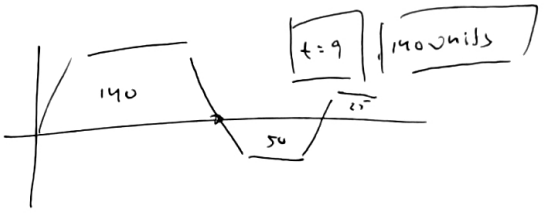
(a) At what times in the interval $0 < t < 18$, if any, does the squirrel change direction? Give a reason for your answer.

$t = 9, 15$. Velocity function changes sign at these moments.

(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 this time?

$140 - 50 + 25$

farthest.



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

$140 + 50 + 25 = 215$

(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 $7 < t < 10$.

$a(t) = \frac{v(10) - v(9)}{10 - 9} = -10$

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

$v(t) = -10t + 90$

$x(t) = x(2) + \int_2^t ($

$-5t^2 + 90t - 215$