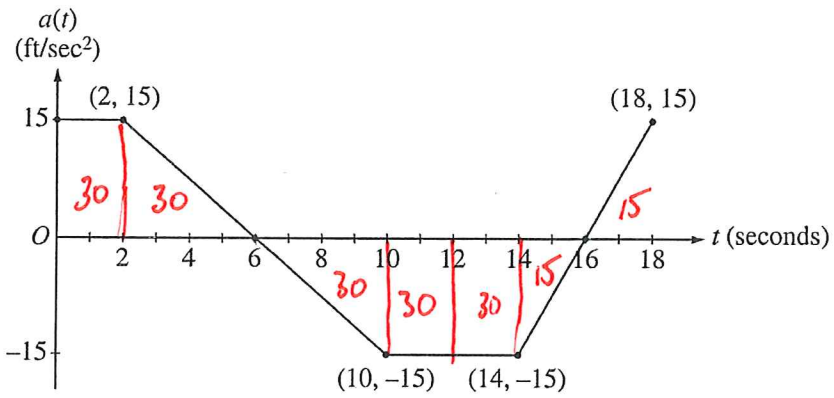
Name: _____ Date: _____ Period: _____ 2016

AP Calculus – Spot Check 4 – Area and Integration



A car is traveling on a straight road with velocity 55 ft/sec at time $t = 0$. For $0 \le t \le 18$ seconds, the car's acceleration $a(t)$, in ft/sec^2, is the piecewise linear function defined by the graph above.

(a) Is the velocity of the car increasing at $t = 2$ seconds? Why or why not?

Yes because $v'(t) = a(t)$ is greater than $\emptyset$.

(b) At what time in the interval $0 \le t \le 18$ other than $t = 0$, is the velocity 55 ft/sec? Why?

$v(t)$ is equal to 55 ft/s when $t = 12$ seconds since $\int_0^6 a(t)\,dt$ is the opposite sign of $\int_6^{12} a(t)\,dt$

(c) On the time interval $0 \le t \le 18$, what is the car's absolute maximum velocity, in ft/sec, and at what time does it occur? Justify your answer.

The maximum velocity occurs at $t = 6$ seconds, with a value of $55 + \int_0^6 a(t)\,dt = 55 + 30 + 30 = 115$ ft/s

(d) At what times in the interval $0 \le t \le 18$, if any, is the car's velocity equal to zero? Justify your answer.

Never, not enough negative area.

_____ points out of 9