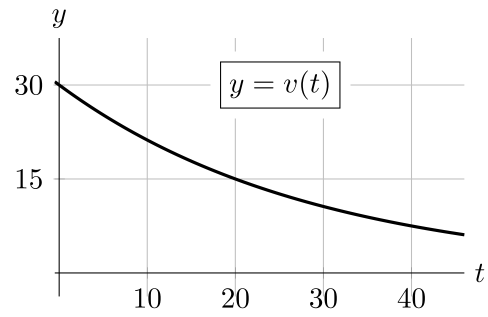
11. [8 points]

A car runs out of gas and begins coasting on a highway. A graph of the car's velocity $v(t)$ in meters per second t seconds after it begins coasting is shown to the right.



Let $d(t)$ be the distance the car has traveled, in meters, since it started coasting, and let $L(t)$ be the linear approximation of $d(t)$ at $t = 20$.

a. [1 point] Approximately how far, in meters, did the car coast over the first 20 seconds after it began coasting? Give the best numerical estimate you can, based on the graph of $v(t)$.

Answer: approximately ______________ meters

b. [2 points] What formula would you get for $L(t)$ if you used your estimate from part **a**?

Answer: $L(t) \approx$ ______________

c. [3 points] In each row below, circle the **one** true statement.

(i) *circle one:*	$L'(20) < d'(20)$	$L'(20) > d'(20)$	$L'(20) = d'(20)$
(ii) *circle one:*	$L'(15) < d'(15)$	$L'(15) > d'(15)$	$L'(15) = d'(15)$
(iii) *circle one:*	$L(15) < d(15)$	$L(15) > d(15)$	$L(15) = d(15)$

d. [2 points] Suppose that at $t = 0$, the car passes a truck on the highway. The truck is traveling in the same direction as the car, and is traveling at a constant speed of s meters per second. Eventually, the truck catches up with the coasting car and passes it at time $t = c$. How fast was the truck traveling?

Give an *exact answer* in terms of c and the function $v(t)$. Your answer may involve derivatives or integrals of $v(t)$, but it should **not** involve the function $d(t)$.

Answer: $s =$ ______________ meters per second