

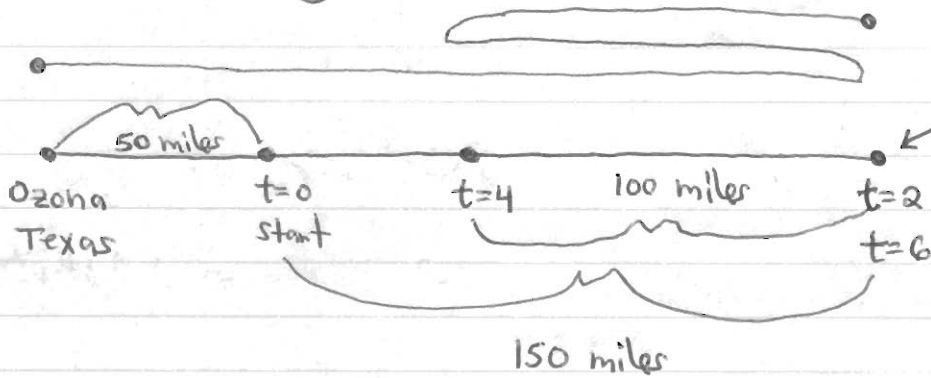
Quiz 9

204)

part a

N
W S E

The first diagram shows where/when the truck changed direction.



The 2nd diagram shows the position of the truck at any time.

at $t=6$ the truck is $50 + 150 = 200$ miles East of Ozona, Texas.

part b

Area of rectangle A = 150

Area of rectangle B = -100

Area of rectangle C = 100

★ The area of rectangle B is negative because the rectangle is BELOW the t-axis and has negative height. ★

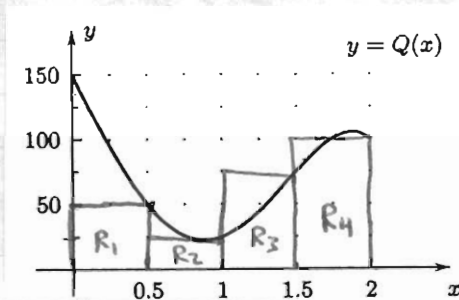
adding these areas gives 150 miles displacement from $t=0$ to $t=6$.

Note: if we ignore the minus sign in the area of rectangle B we get a total area of $150 + 100 + 100 = 350$ miles ^{representing} ~~of~~ distance that the truck traveled from $t=0$ to $t=6$.

At $t=0$ we are already 50 miles East of Ozona so at $t=6$ we ~~are~~ add this original displacement to the 150 miles to obtain a total of 200 miles of displacement.

This means that at $t=6$ ~~we~~ the truck is 200 miles East of Ozona, Texas.

223)



The diagram above shows 4 rectangles with right-hand endpoints. The total area of the 4 rectangles is $25 + 12.5 + 37.5 + 50 = 125$ sq. units OR $\frac{1}{2} [50 + 25 + 75 + 100]$
 $\Delta x = 1/2$ and $50 = \text{height of 1st rectangle etc.}$

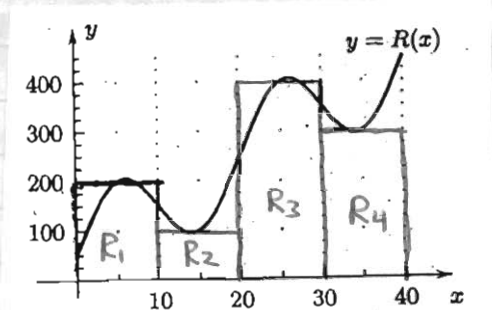
A similar calculation with left-hand endpoints and the same number of rectangles, namely 4, gives a total area of

$$\frac{1}{2} [150 + 50 + 25 + 75] = 150 \text{ sq. units}$$

If we average 125 and 150 we obtain 137.5

so that $\int_0^2 Q(x) dx \approx 137.5$

224)



The diagram above shows 4 rectangles with midpoints. The midpoint is the halfway point of each subinterval. For example, on the subinterval $[20, 30]$, 25 is the midpoint and $R(25) = 400$ is the height of the 3rd rectangle. The height of the other rectangles are found similarly. The total area of all 4 rectangles is $10[200 + 100 + 400 + 300] = 10,000$ sq. units.

This means $\int_0^{40} R(x) dx \approx 10,000$.

↑
"approximately equal to"