



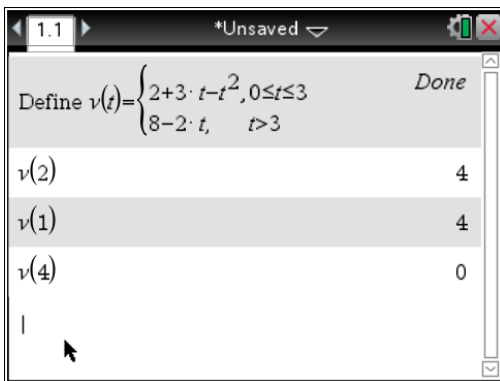
PIECEWISE FUNCTIONS

KINEMATICS

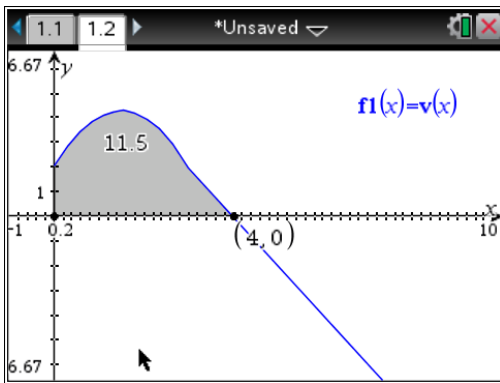
A particle moves in a straight line so that its velocity v (m/s) at time t (s) is given by

$$v = \begin{cases} 2 + 3t - t^2 & \text{for } 0 \leq t \leq 3 \\ 8 - 2t & \text{for } t > 3 \end{cases}$$

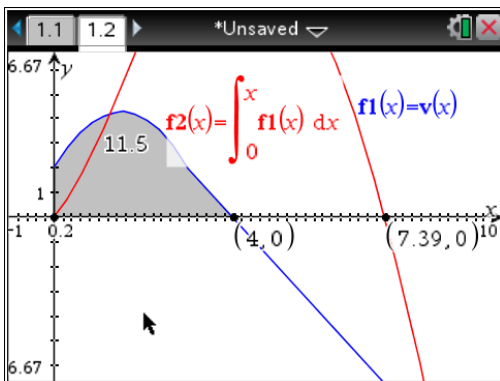
- Find the distance travelled by the particle from its initial position until it comes to rest. 11.5
- Find the time taken for the particle to return to its initial position. 7.39



Sketch the graph and find the distance as the shaded area.

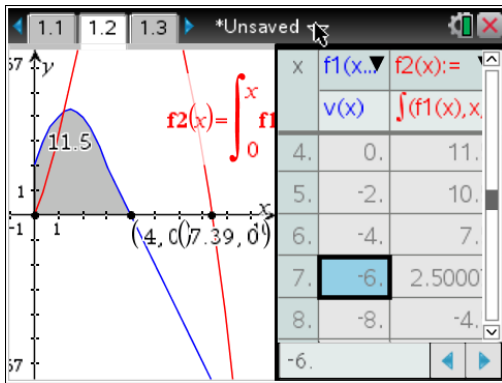


Draw the antiderivative and find where it cuts the x-axis.

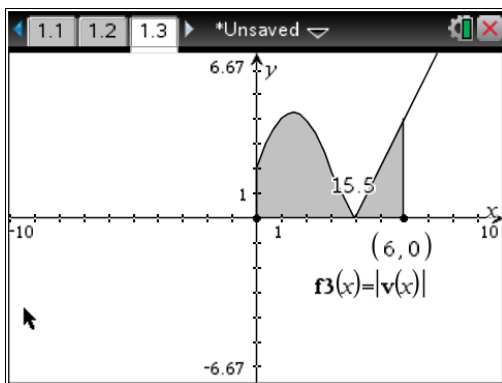




Using Table



Use the absolute value of velocity to find the distance travelled for times greater than 3:

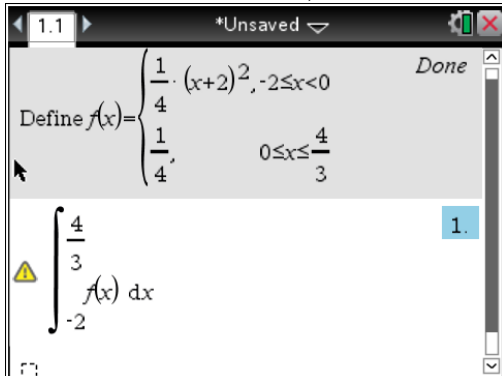


CONTINUOUS PROBABILITY DISTRIBUTIONS

A continuous random variable X has a probability density function given by the function $f(x)$, where

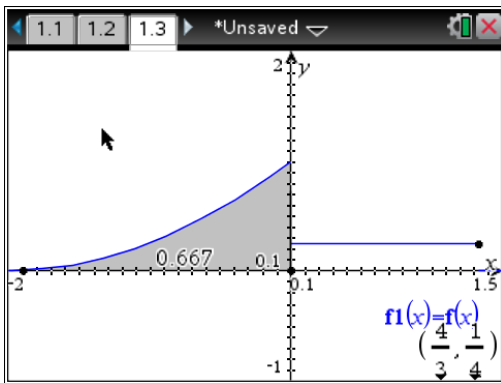
$$f(x) = \begin{cases} \frac{1}{4}(x+2)^2, & -2 \leq x < 0 \\ \frac{1}{4}, & 0 \leq x \leq \frac{4}{3} \\ 0, & \text{otherwise} \end{cases}$$

Find the mean of X ; Define the function, check that the area is 1, then find the mean.

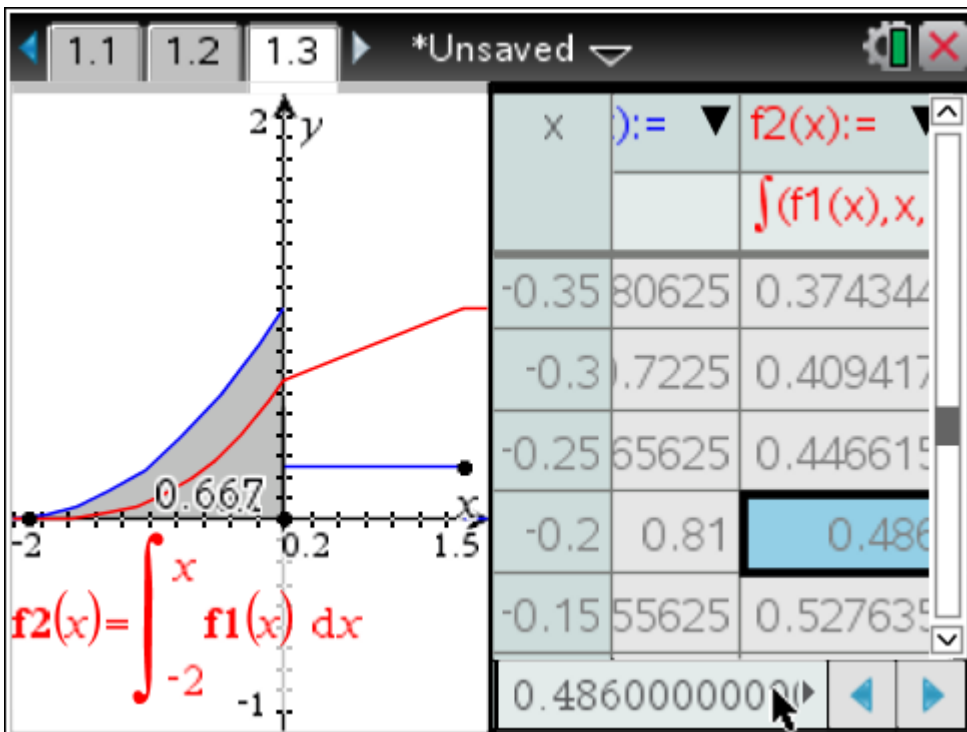




Median: as the area on the left is 0.667 which is more than 0.5, the median will be less than 0.



Changing Table settings allows to see where the median lies. A nice teaching tool.



Using numerical solve:



1.1 1.2 1.3 *Unsaved

nSolve $\left(\int_{-2}^m f(x) dx = 0.5, m \right)$ -0.182879

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