TOOL: The steps below govern the graphing of $\dfrac{df(t)}{dt}$ given the shape of $f(t)$ in a given interval, $[t_1, t_2]$, from time t_1 to t_2. Fig. 1 shows an example function. Fig. 2 shows the derivative.

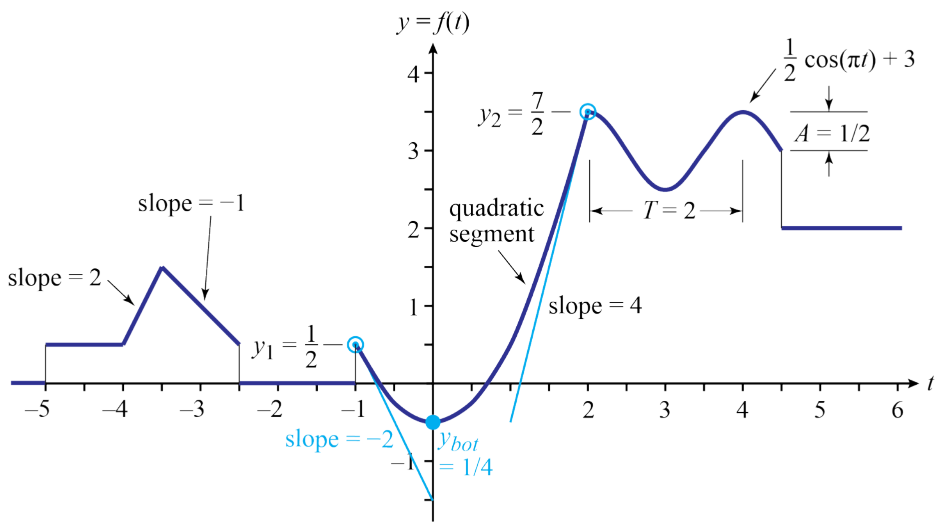

Fig. 1. Example function.

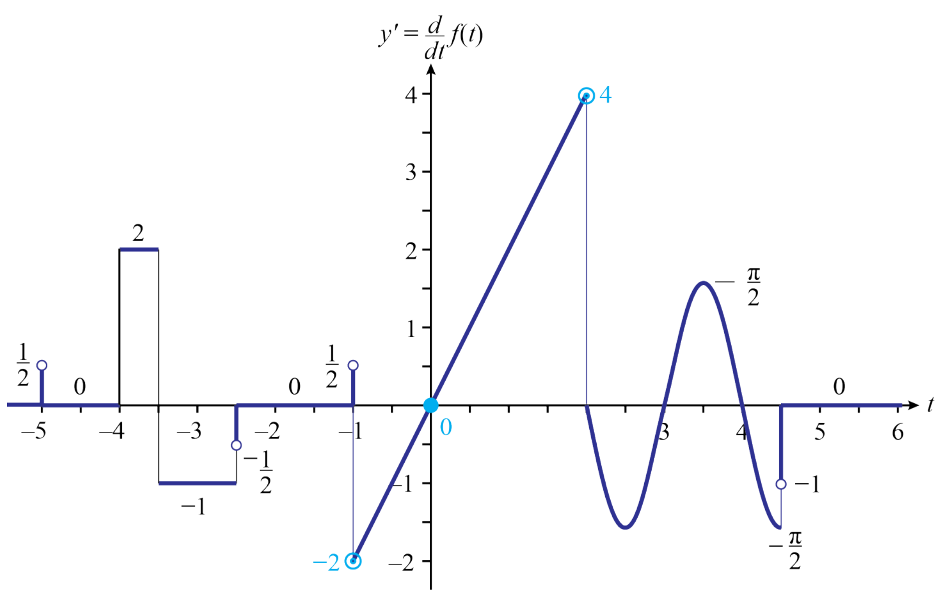

Fig. 2. Graph of derivative of example function.

Steps for graphing Derivative:

1. The derivative of a step discontinuity is an impulse function of area equal to the height of the step. The prototypical example is the derivative of the unit step function:

   $$\delta(t) = \frac{du(t)}{dt}.$$

   Note: An impulse is shown as a lollipop or arrow with its area listed next to it.

2. The derivative of a constant section of $f(t)$ is zero.

3. The derivative of a sloped line is the slope computed as rise over run.

4. The derivative of a quadratic section of a function is a line. The endpoints of the line are the slope of the quadratic at its left and right endpoints.

5. If the maximum or minimum of the quadratic segment is between t_1 and t_2, as in our example, the value of the derivative at that point is zero. The line in Step 4 must pass through zero at the time of the quadratic maximum or minimum. For a more precise method of plotting a quadratic segment, see CTools: Rosetta Stone Method: Graphical math: Derivative: Quadratic.

6. The derivative of a curve of higher than second order may be estimated by sight: the derivative is the slope of the tangent line at a given point on the curve.