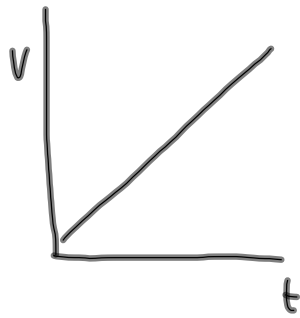


# Acceleration + v-t graphs

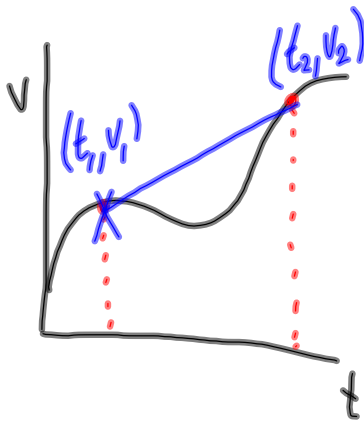
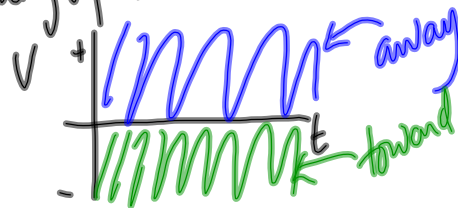


← constant slope ⇒ constant acceleration.

Slope = acceleration

Slope on v-t does not tell you direction

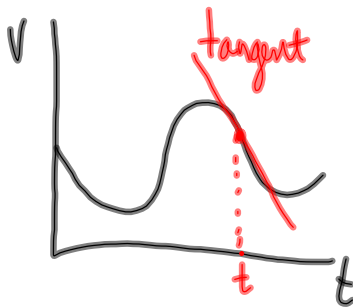
The direction on a v-t graph is indicated by the portion of the graph:



What is the acceleration (average)?

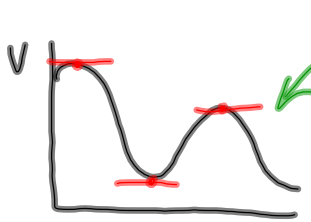
$$\text{slope} = \frac{\Delta y}{\Delta x}$$

$$\frac{y_2 - y_1}{x_2 - x_1}$$



Instantaneous Velocity

Find the slope of the tangent



instantaneous acceleration is ZERO!

SDs

Adding/Subtracting  $\Rightarrow$  place value

$$\Delta T = 75.\underline{2}^{\circ}\text{C} - 81.\underline{9}^{\circ}\text{C}$$

$$\Delta T = -\underline{6.7}^{\circ}\text{C}$$

$\uparrow$  2sd.

Multiplying/Dividing:

(least # of  
sds)

$$Q = mc\Delta T$$

$$Q = (58.9\text{g})(4.18\frac{\text{J}}{\text{g}^{\circ}\text{C}})(\overset{2\text{sd}}{\textcircled{6.7^{\circ}\text{C}}})$$

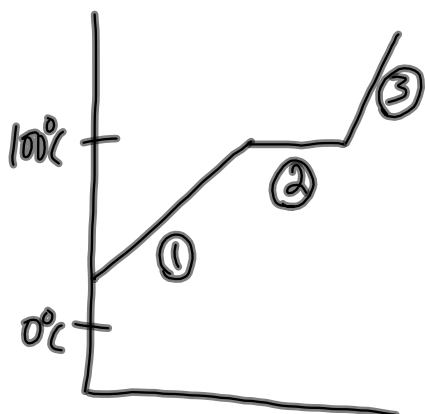
2sd  $\rightarrow$

$$Q = ?$$

$$-1649.5534\text{J}$$

$$Q = -1.6 \times 10^3\text{J}$$

Heat water (58.9g) from 25.2°C to 131.9°C



① heating liquid water 25.2°C to 100.0°C

② evaporation of water

③ heating steam 100.0°C to 131.9°C

①  $Q = mc\Delta T$

$$Q = (58.9g)(4.18 \frac{J}{g^\circ C})(100.0^\circ C - 25.2^\circ C)$$

$$Q = 18415.9096 J$$

18415.9096 J

133114 J

3513.5617 J

---

155043.4713 J

1.55 x 10<sup>5</sup> J

②  $Q = m\Delta H_{vap}$

$$Q = (58.9g)(2260 \frac{J}{g})$$

$$Q = 133114 J$$

③  $Q = (58.9g)(1.87 \frac{J}{g^\circ C})(131.9^\circ C - 100.0^\circ C)$

$$Q = 3513.5617 J$$