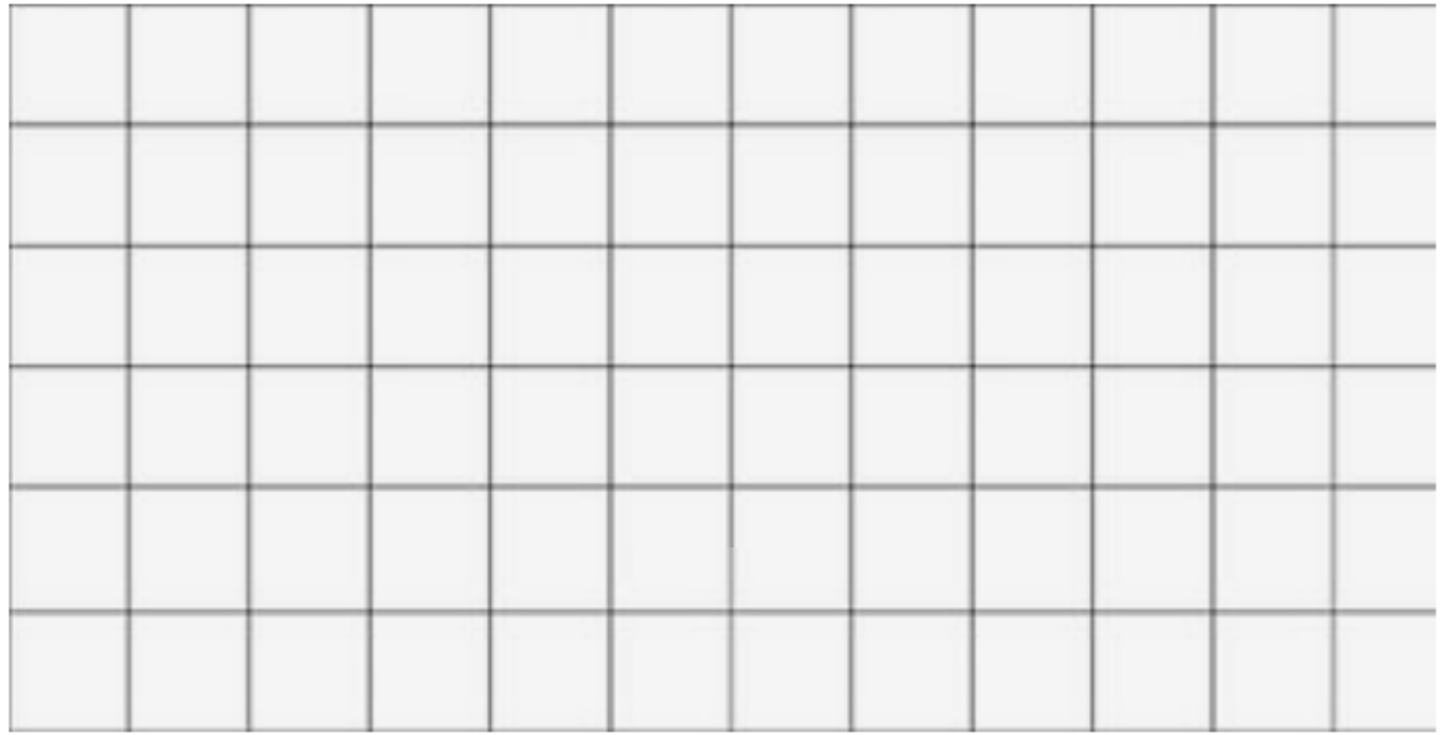
* *Voltaje Promedio de una señal*

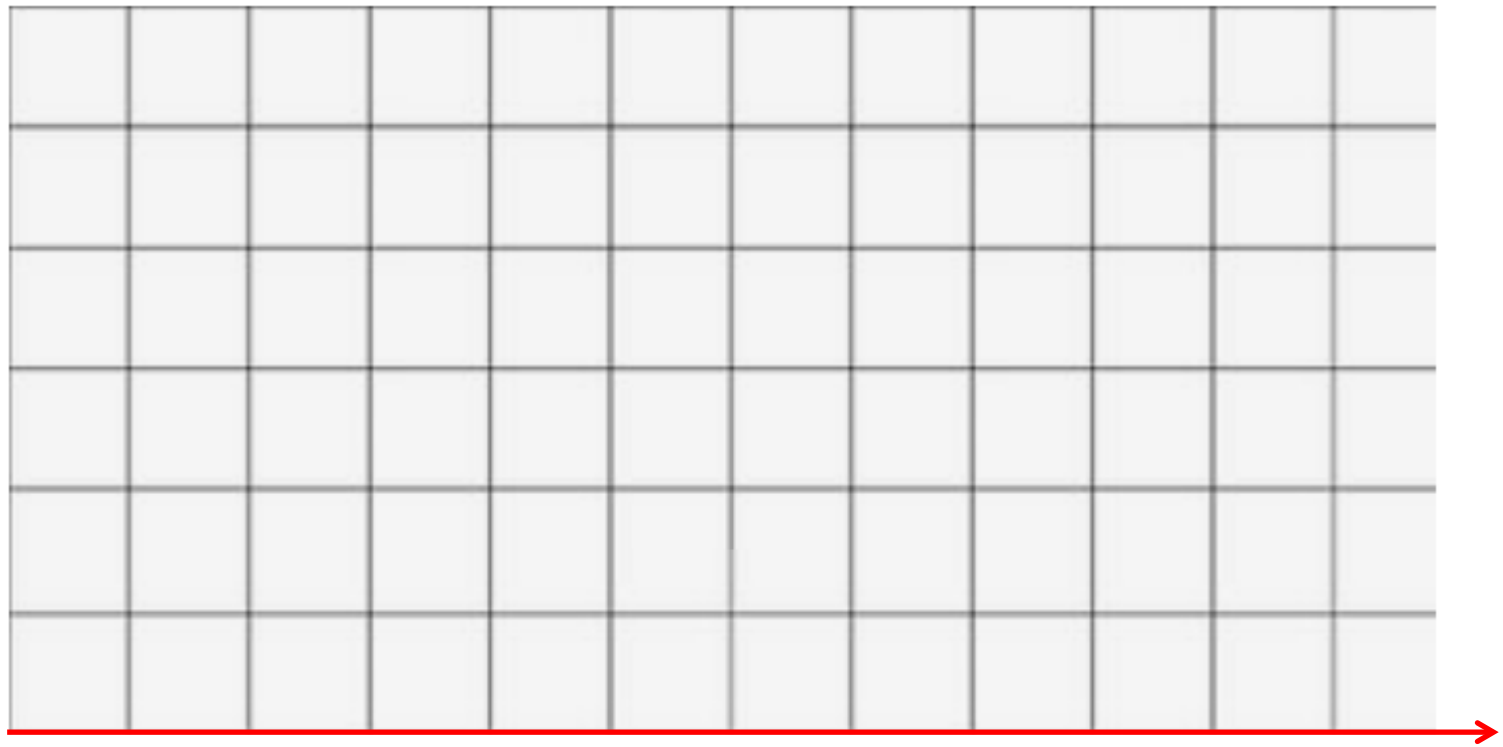
*Voltaje *RMS*

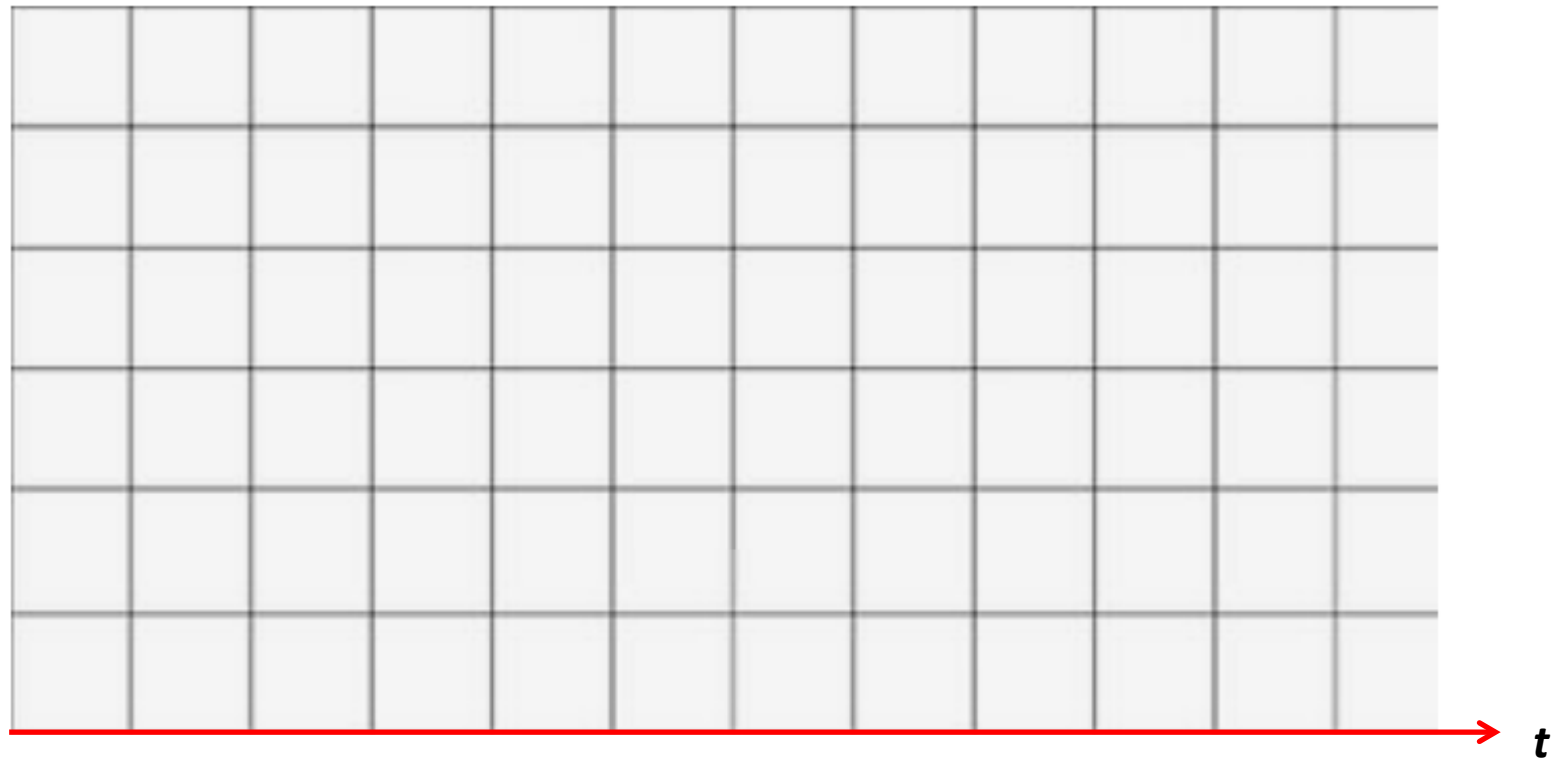
* *Voltaje Promedio de una señal*

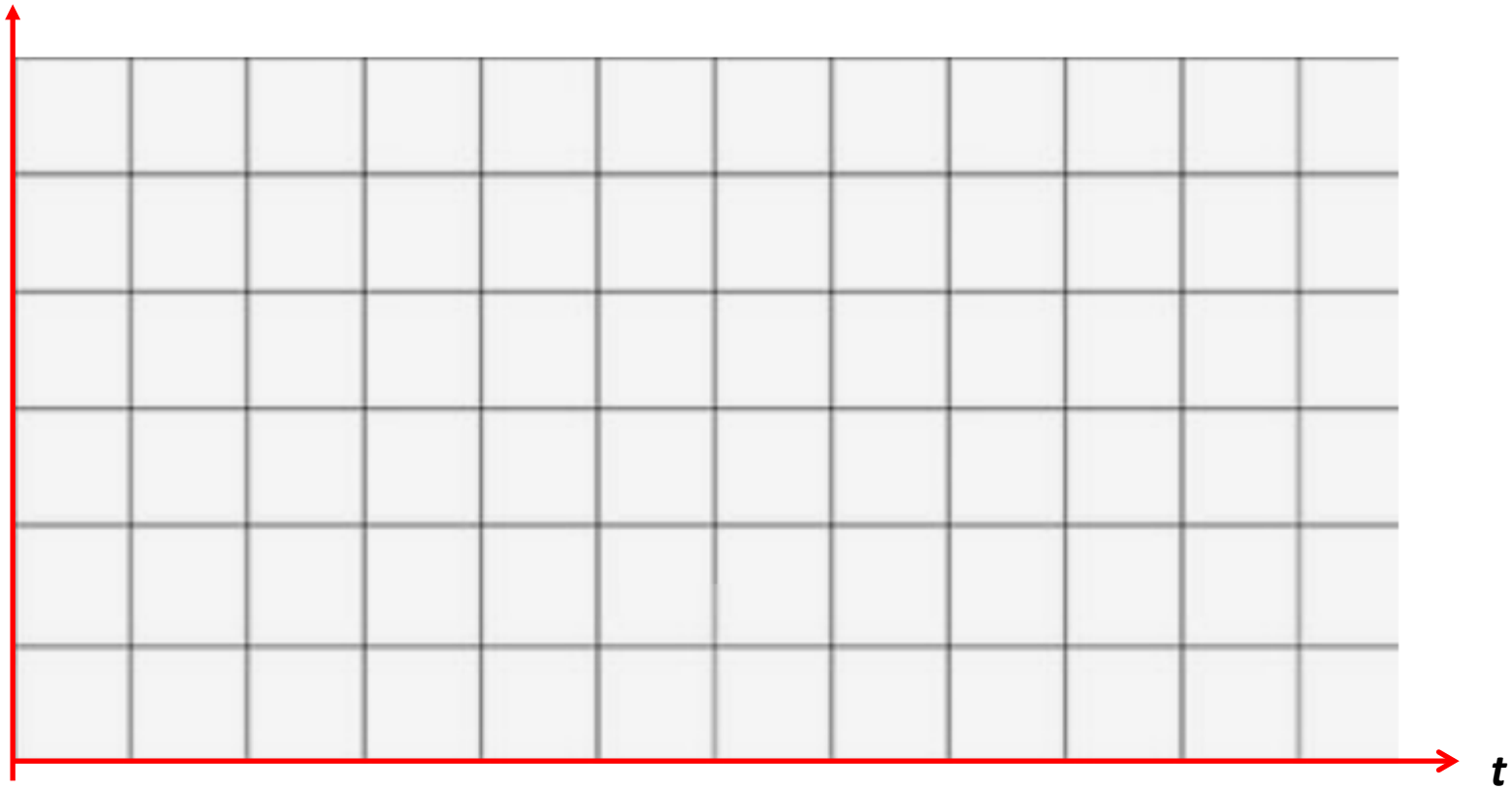
*Ejemplo*

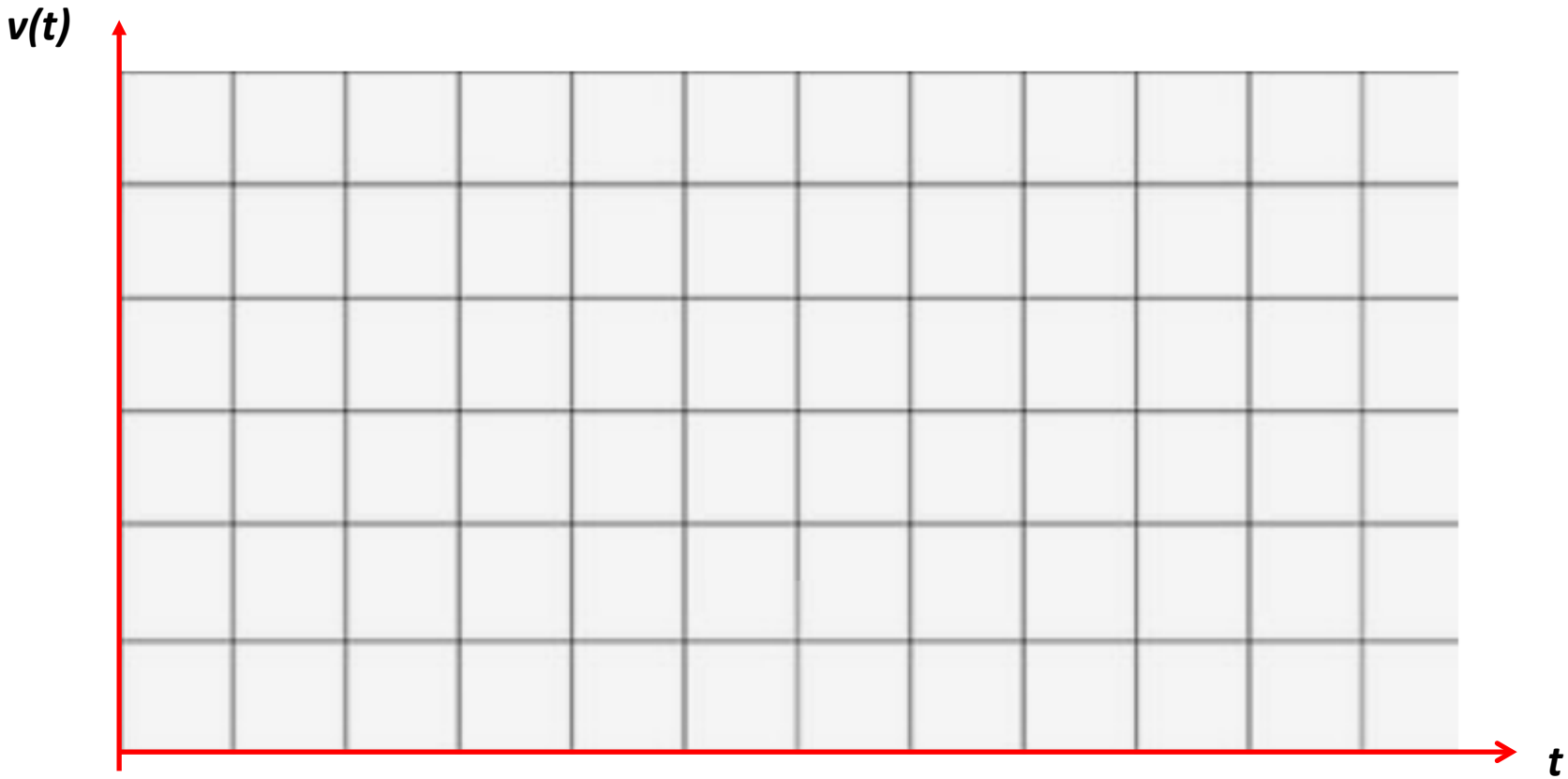
*Señal* 1

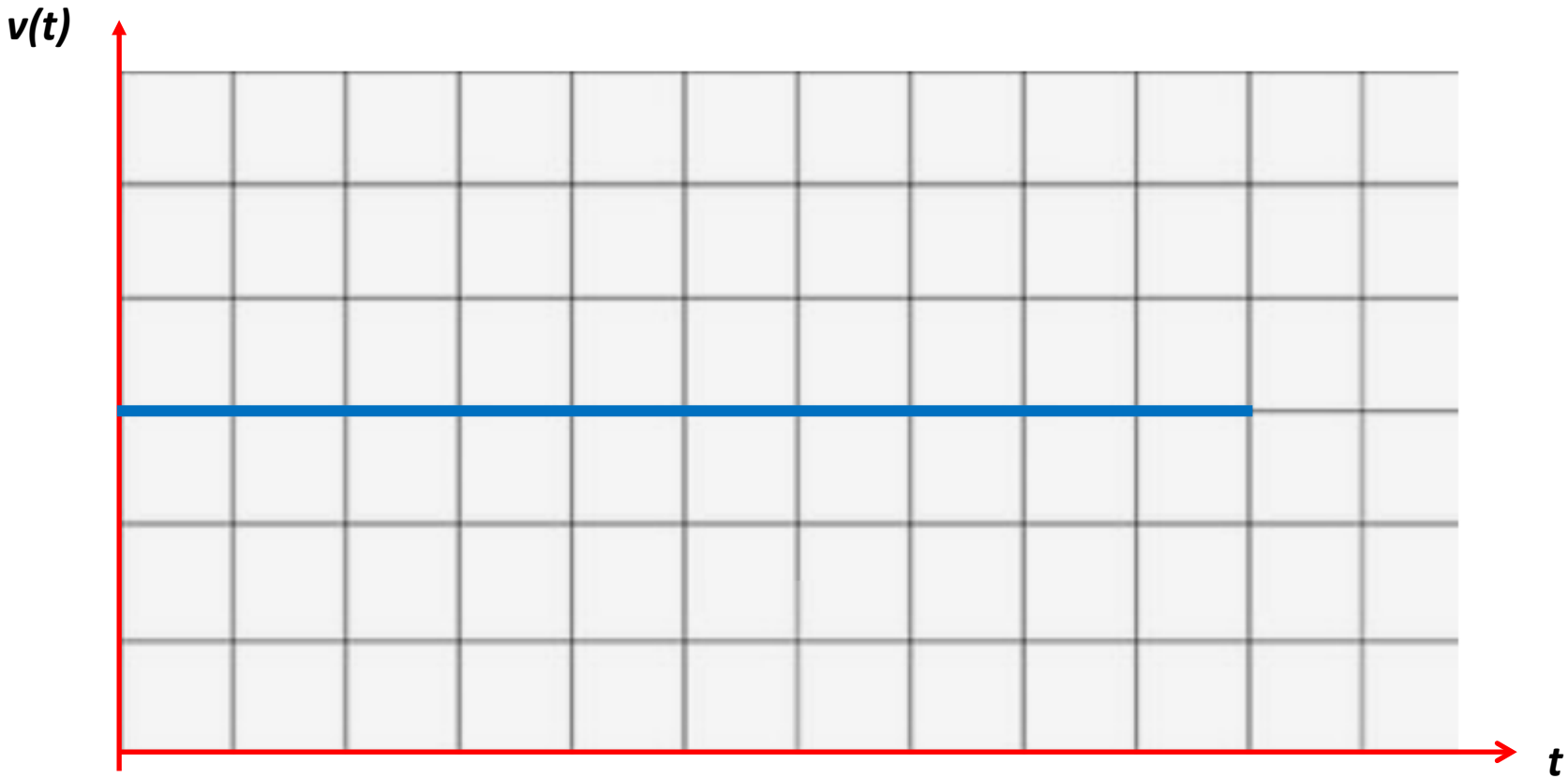


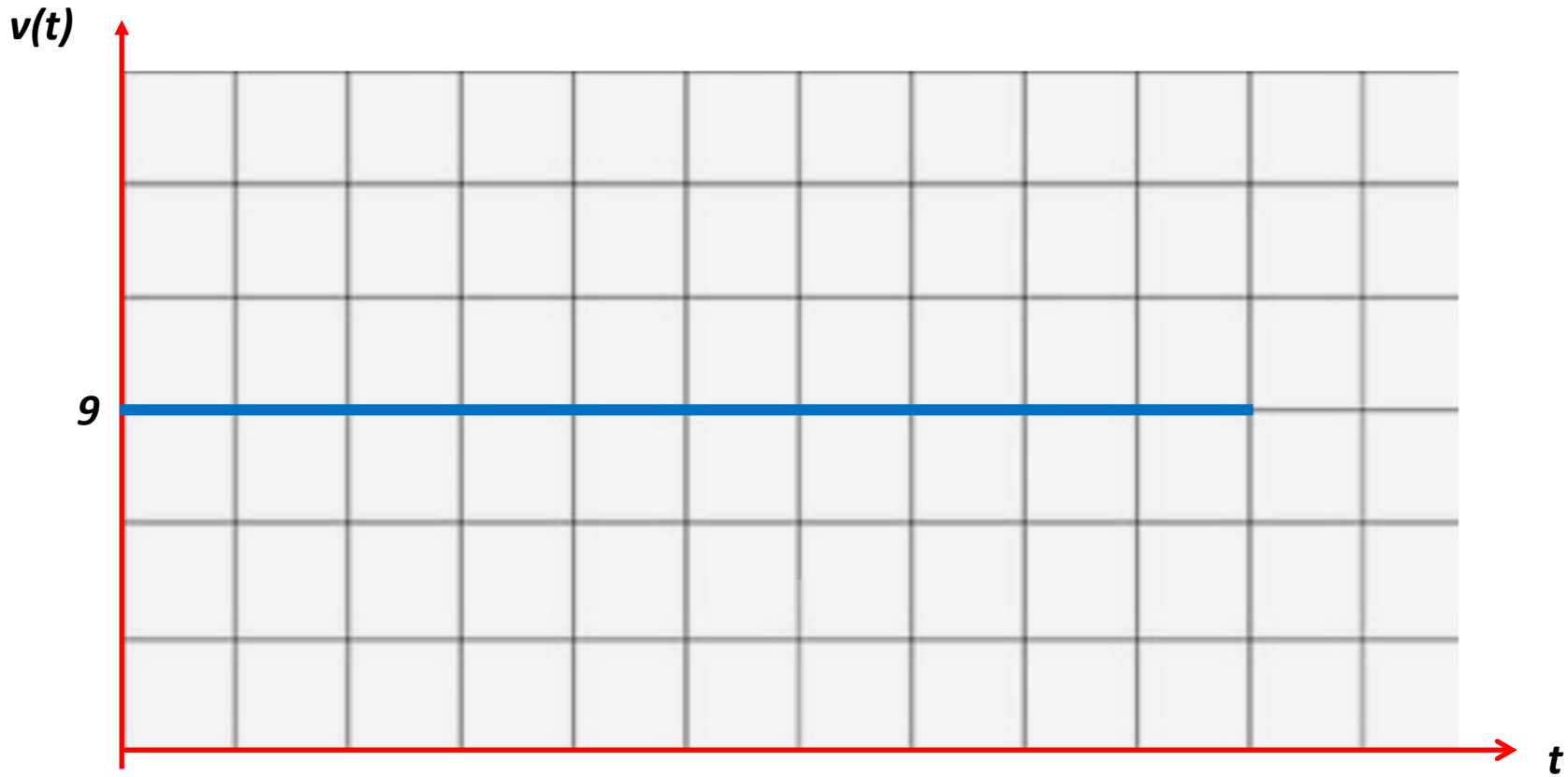


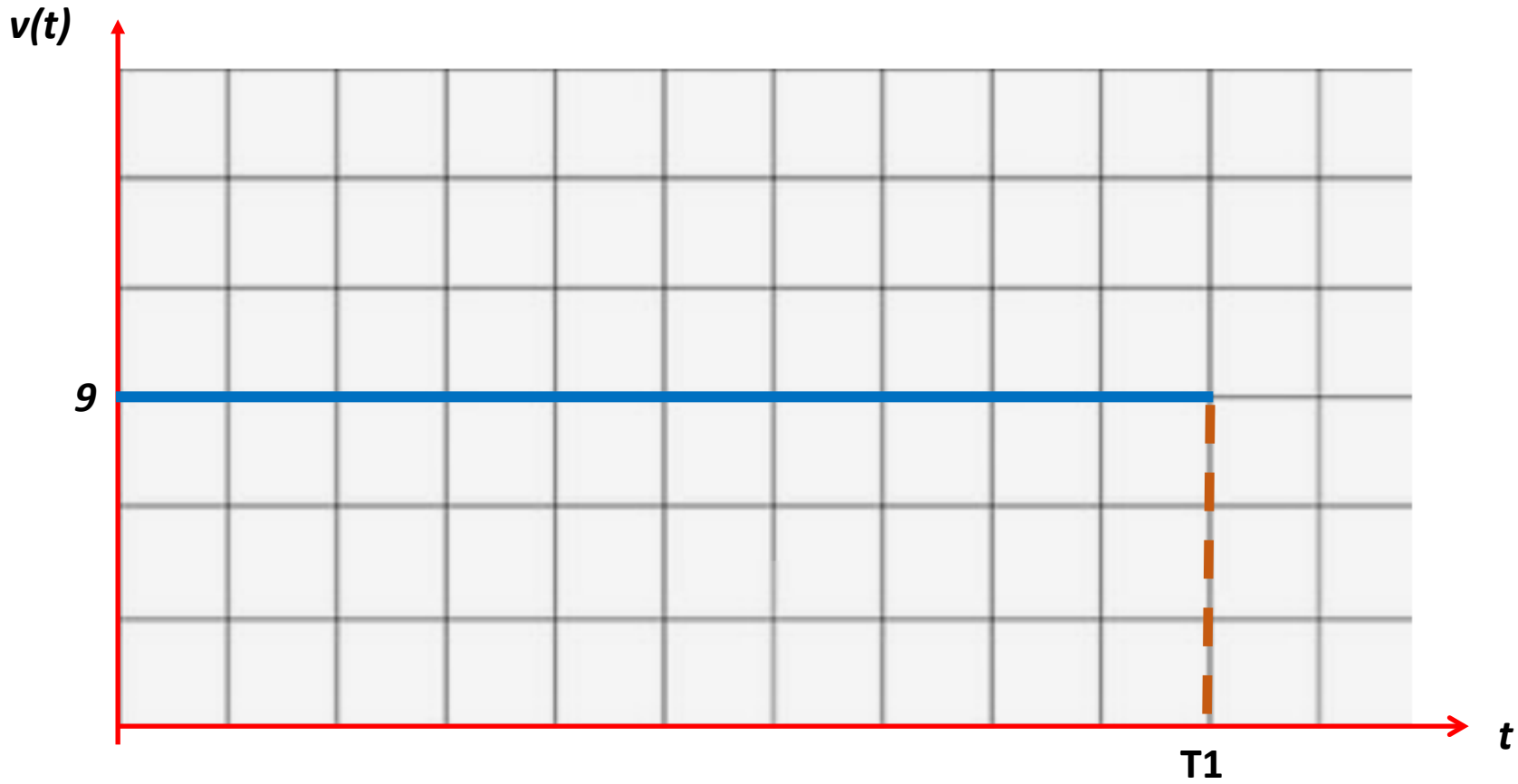

t

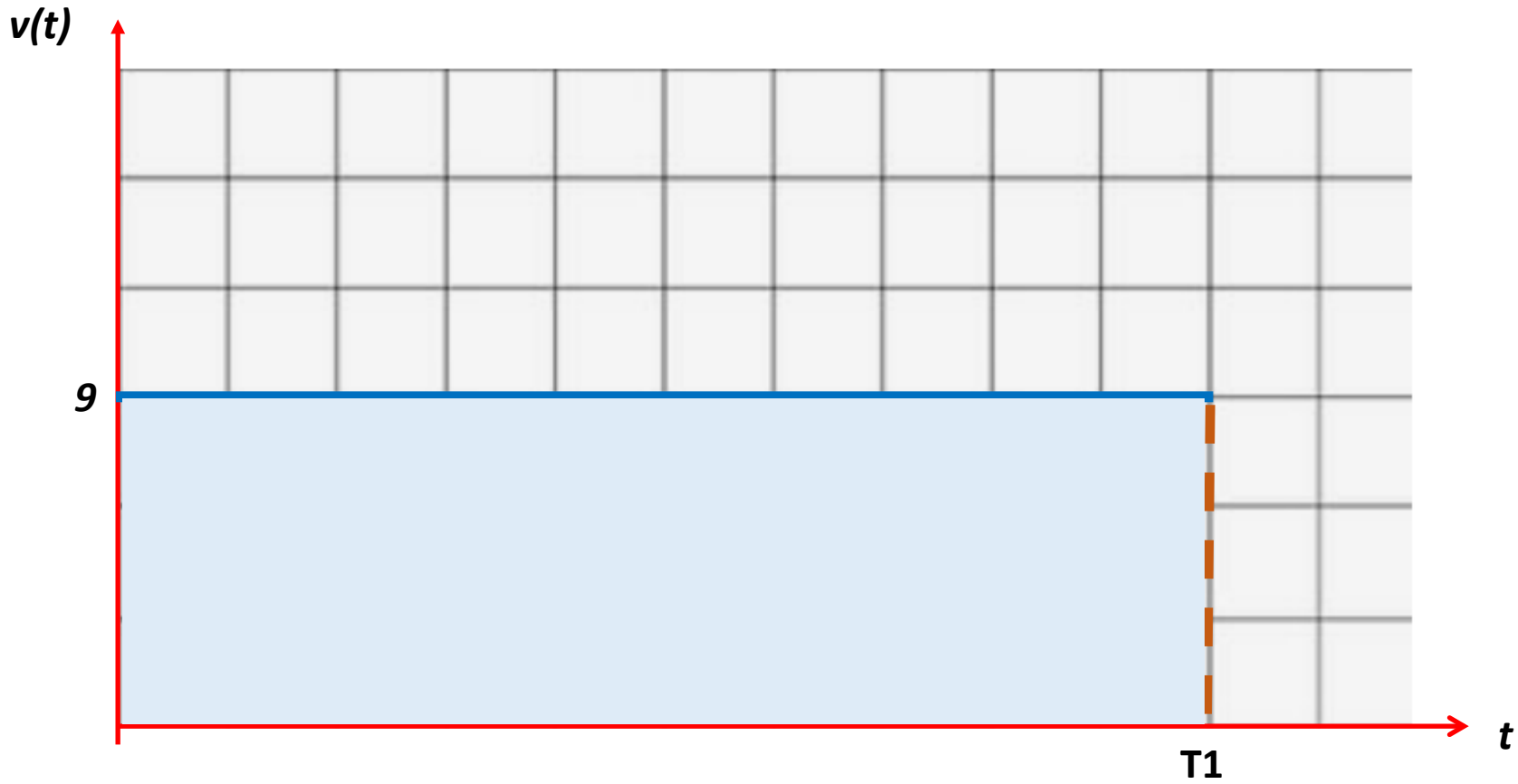

t

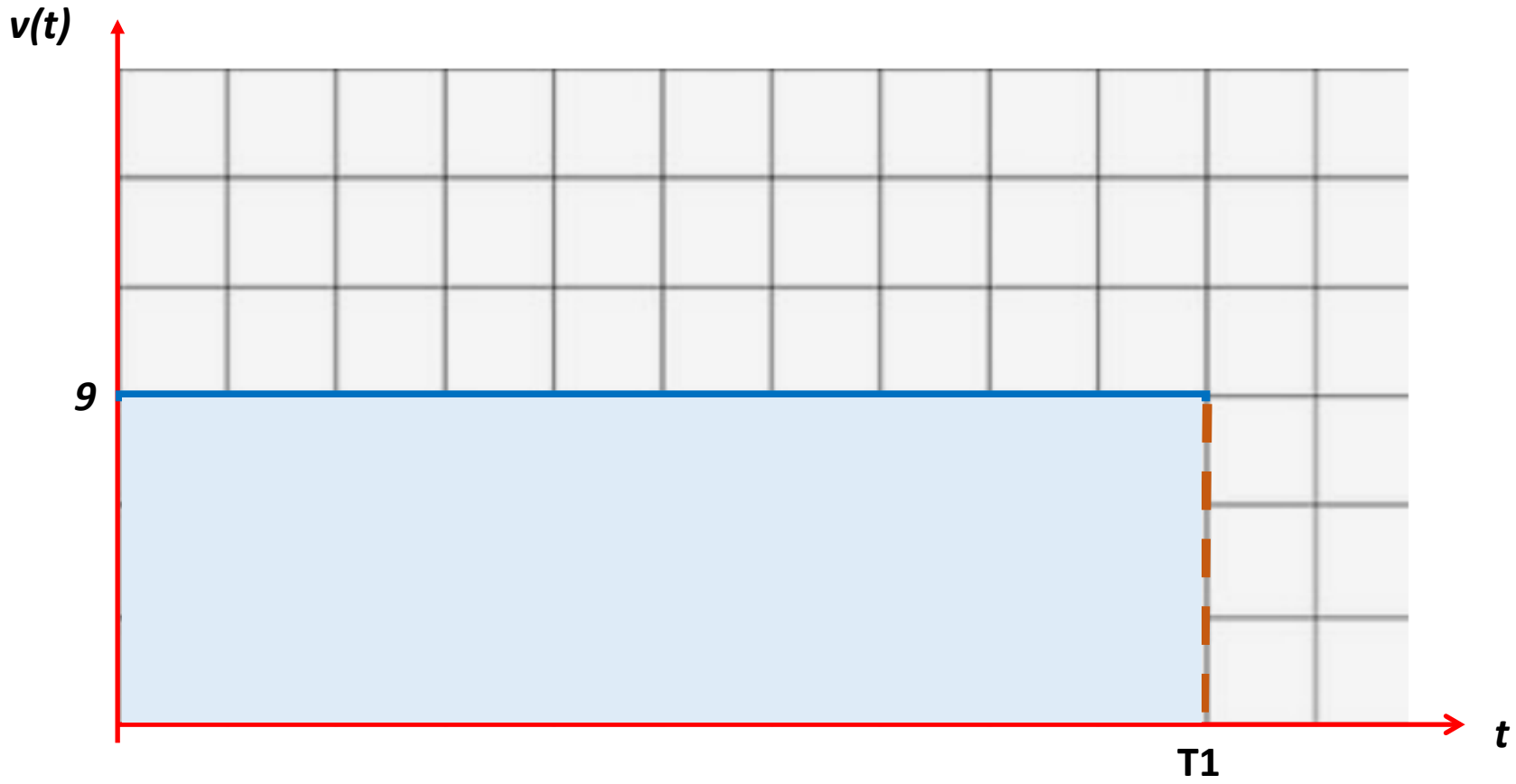

v(t)
t


v(t)
t


v(t)
9
t

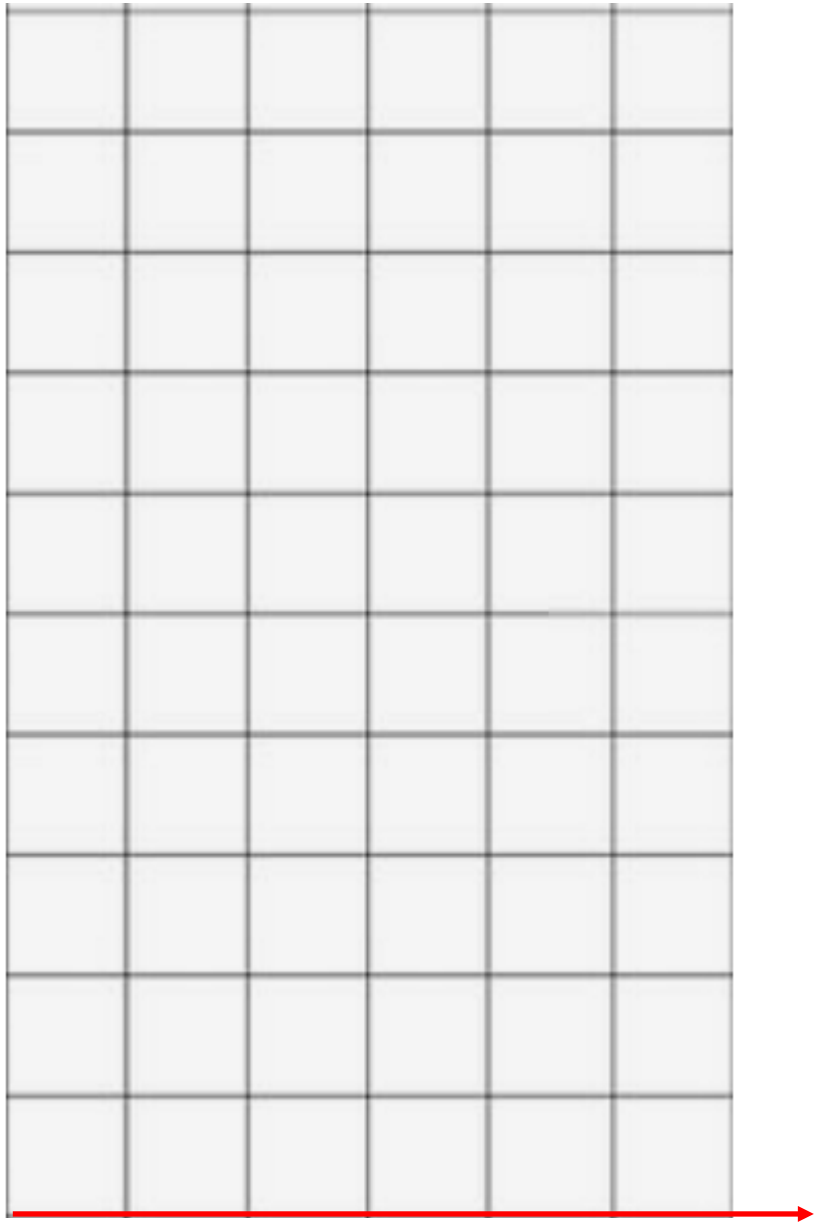

v(t)
9
t
T1

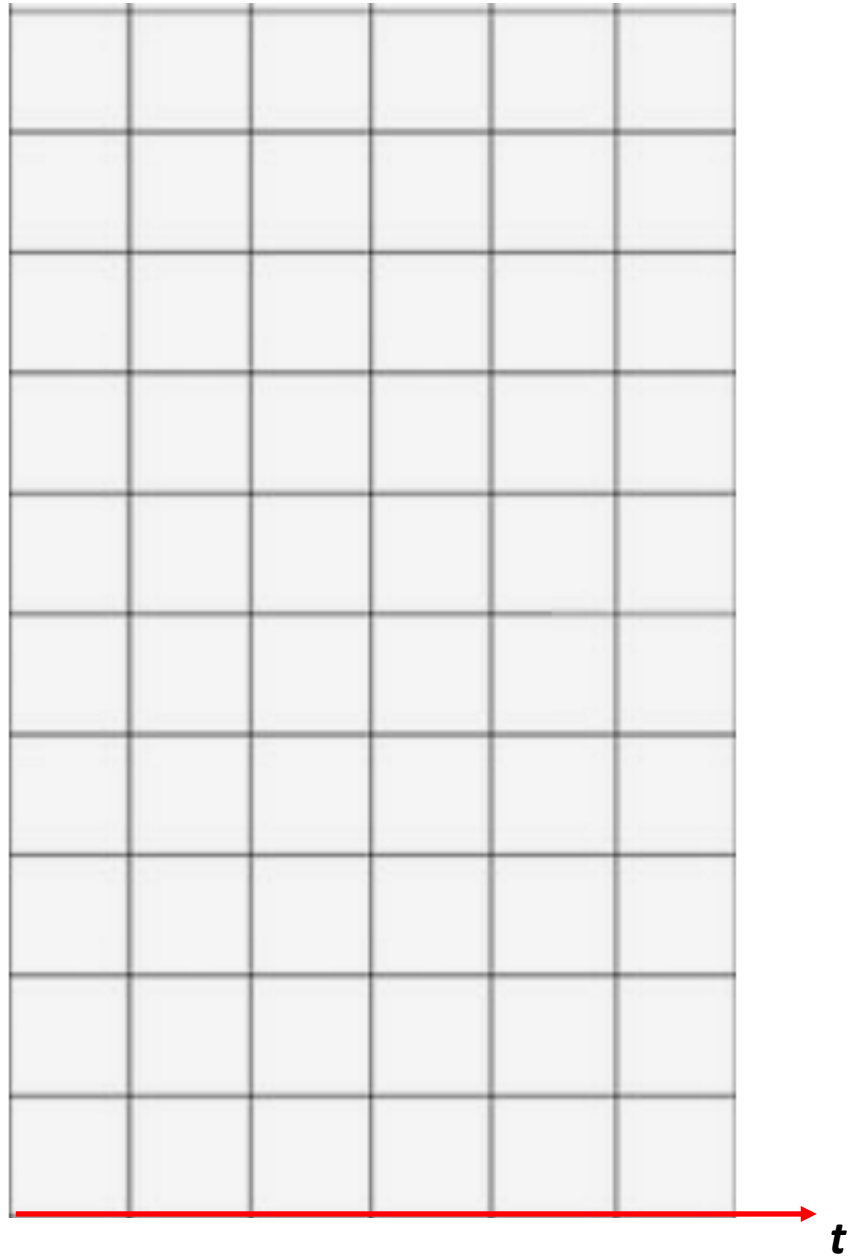

v(t)
9
t
T1

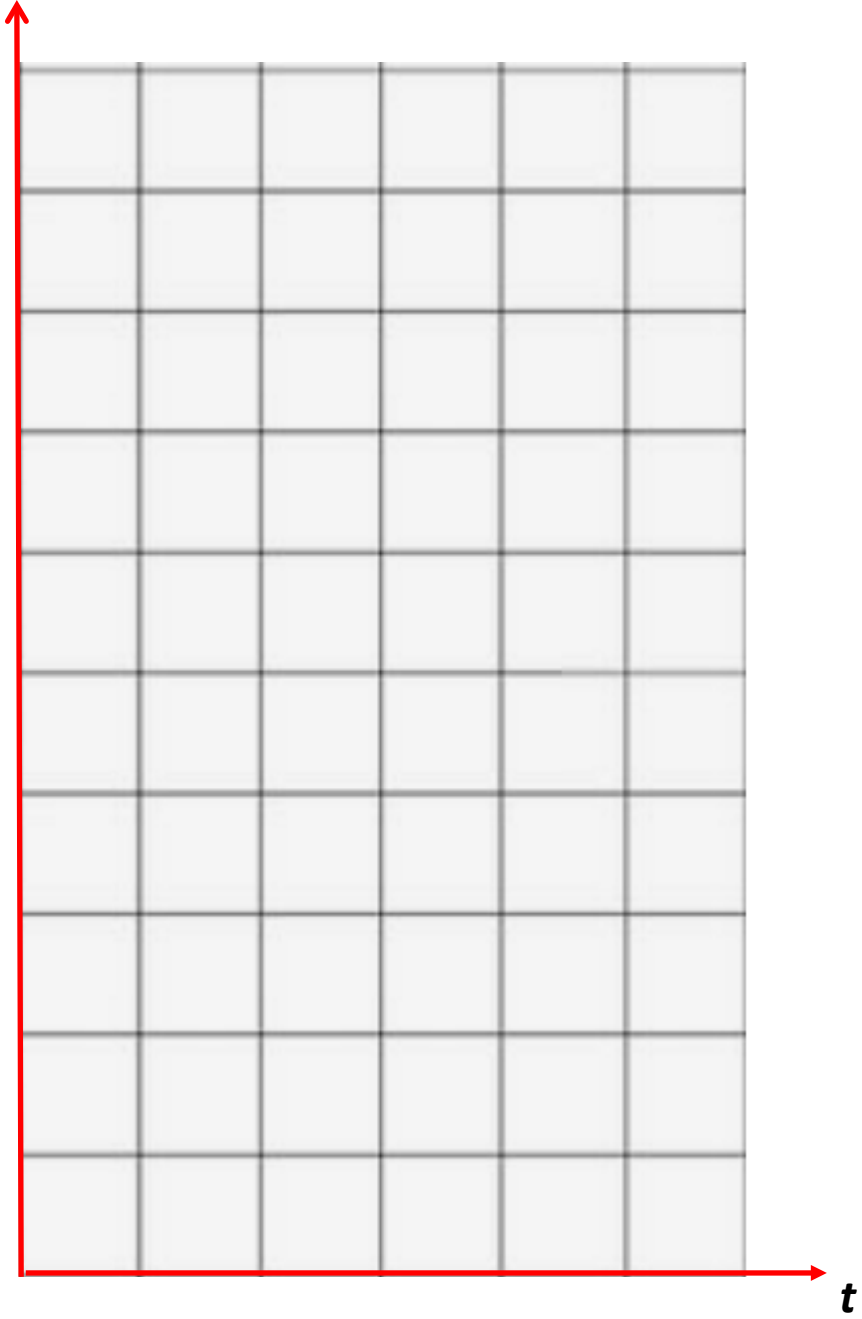



$$V_{prom} = 9$$

*Ejemplo*
*Señal 2*




t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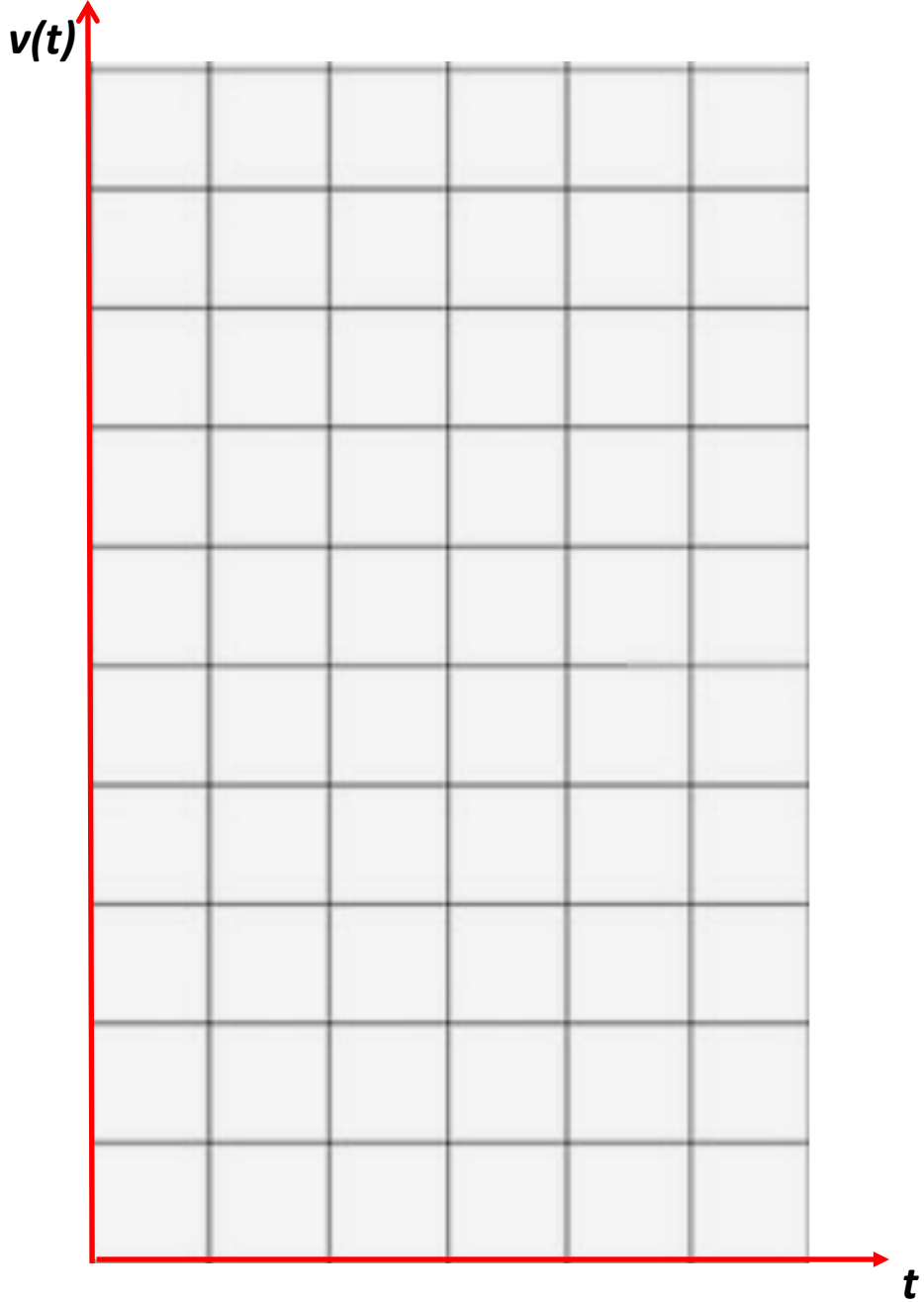
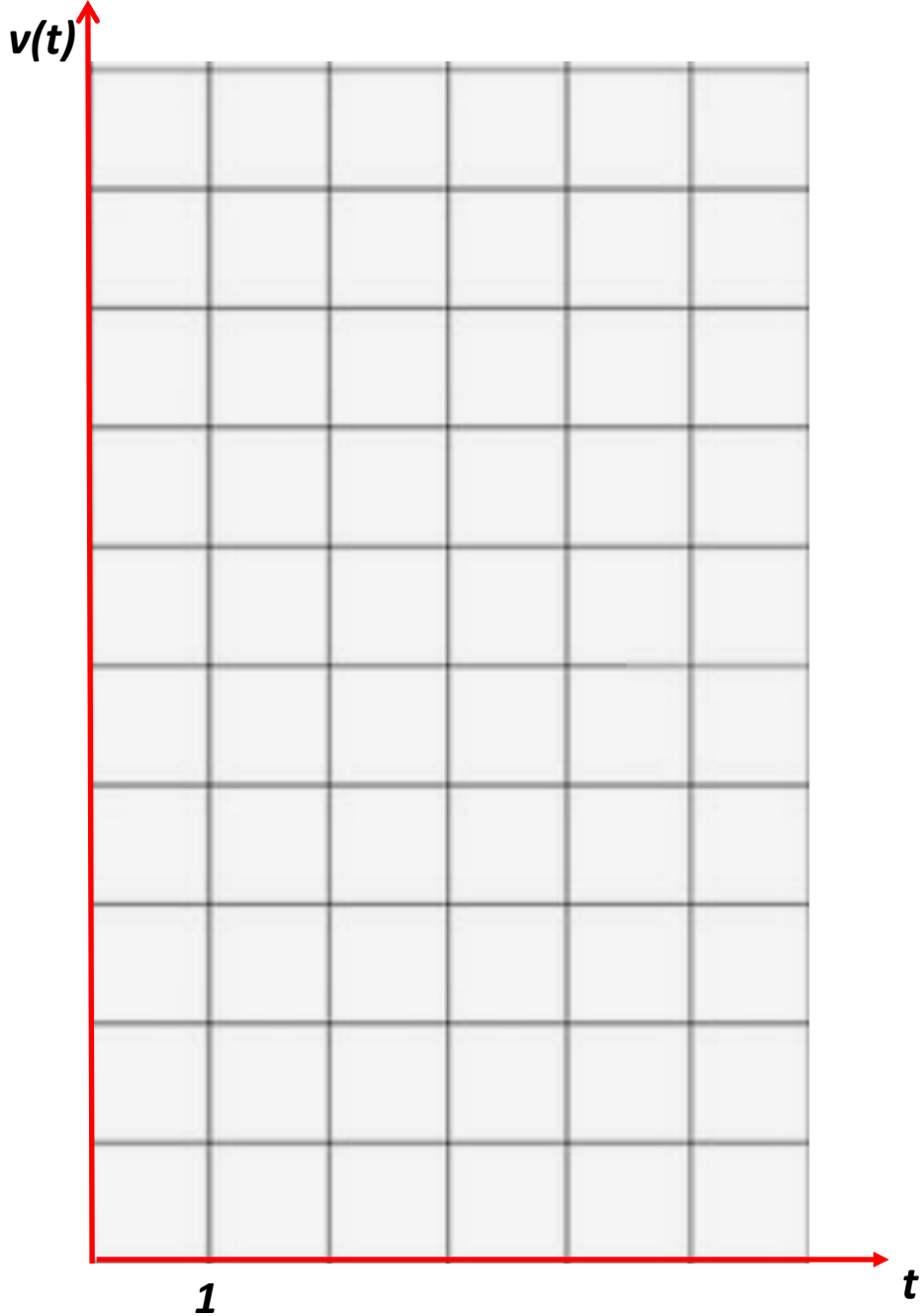
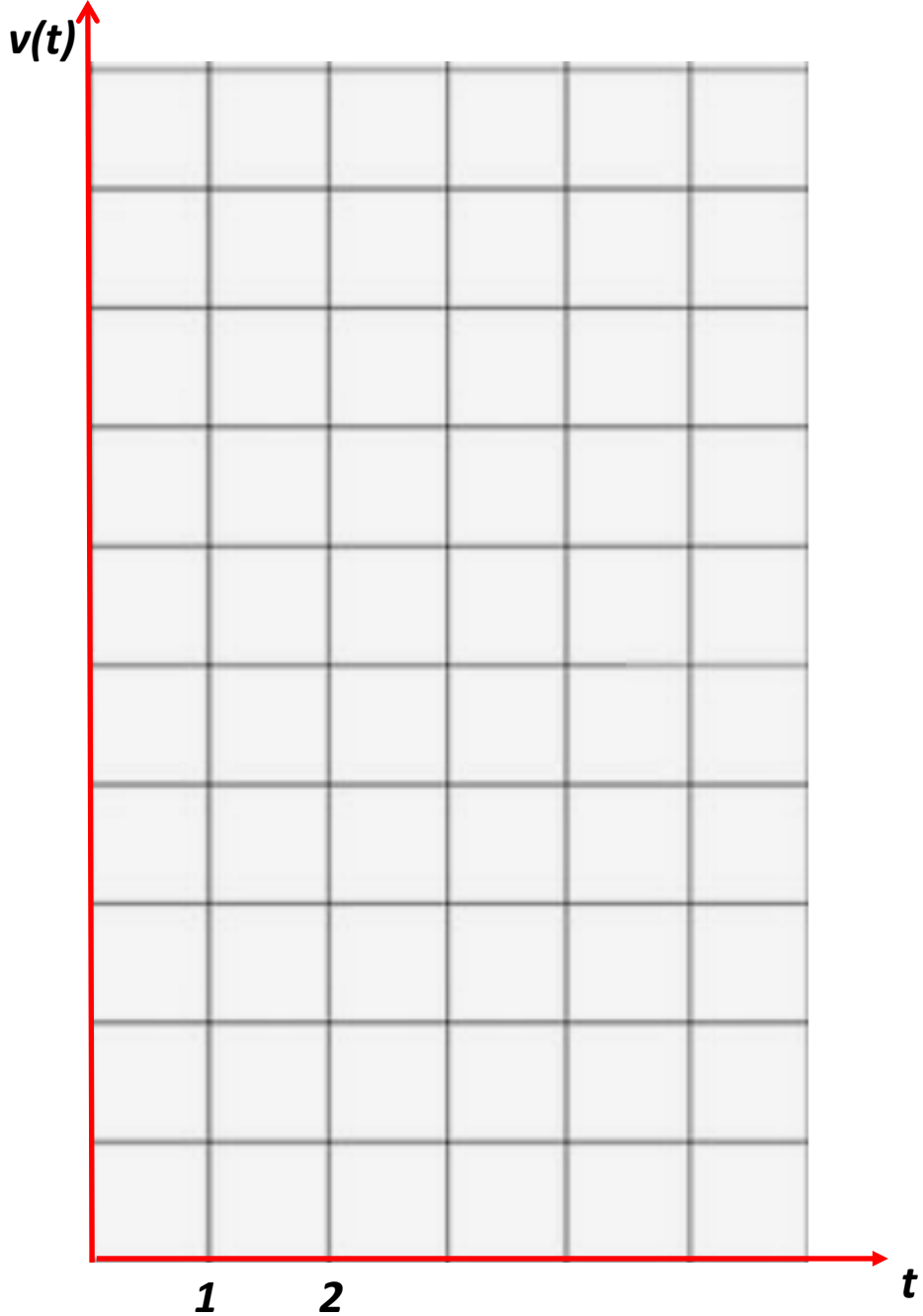
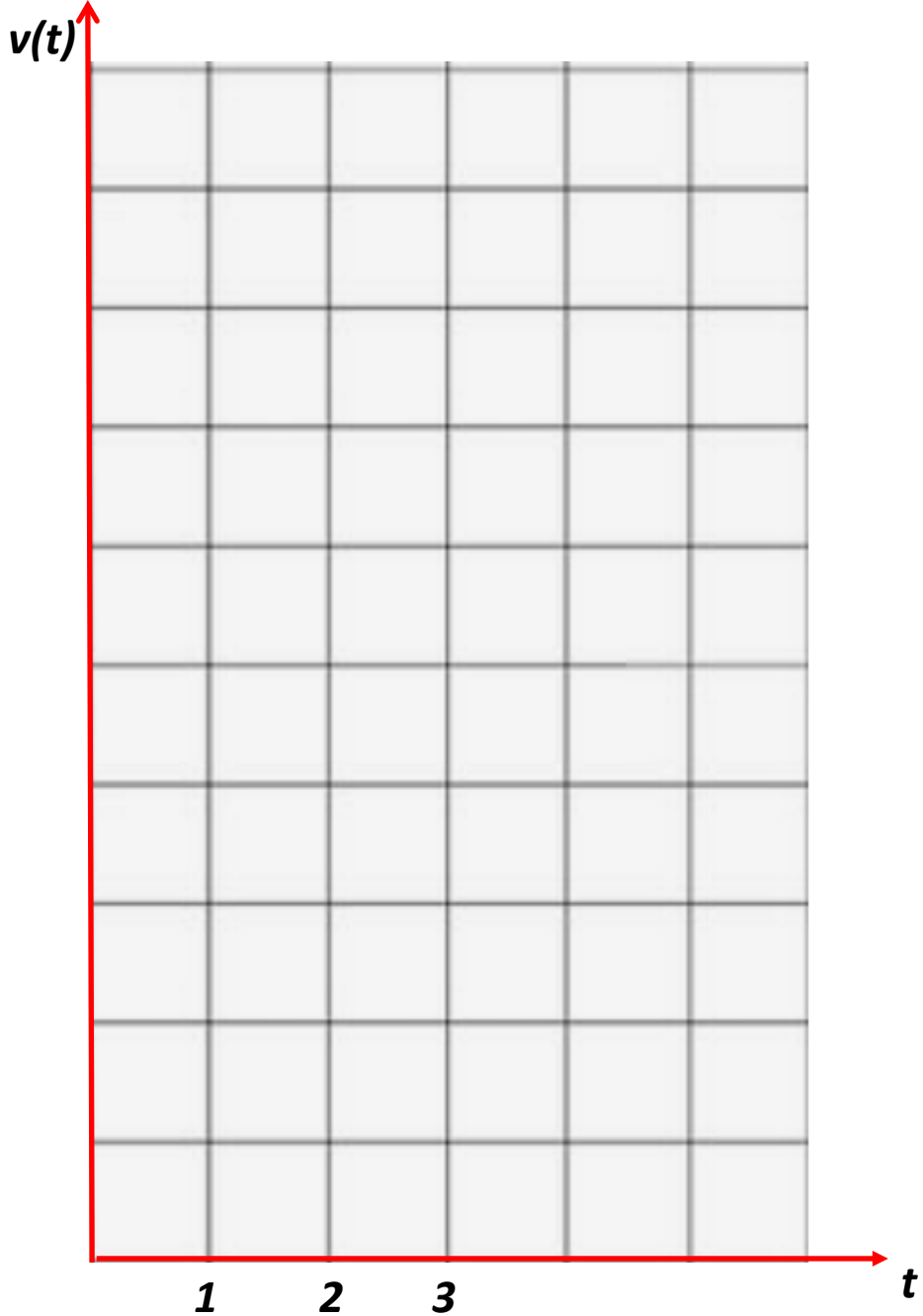
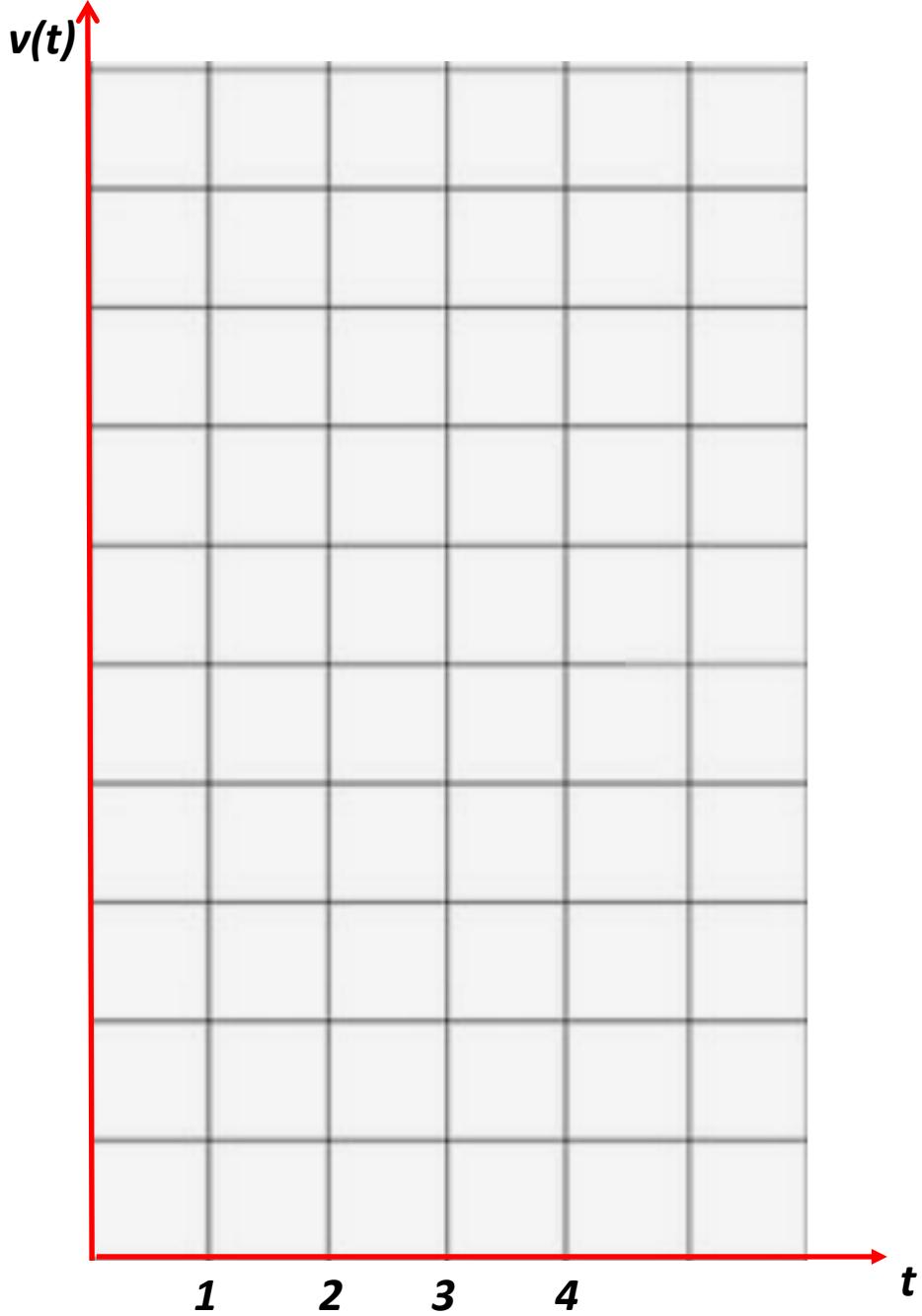
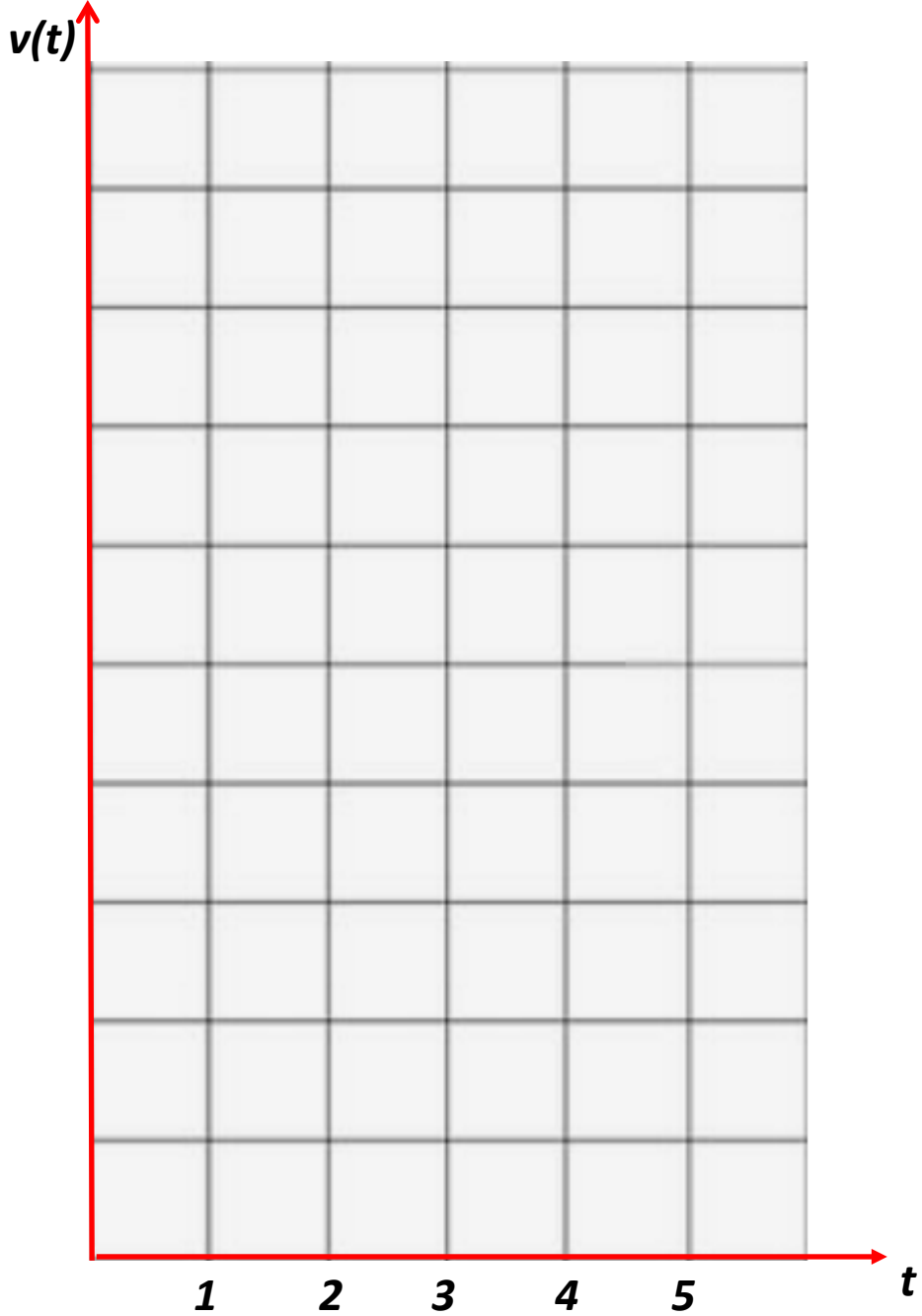

v(t)
t

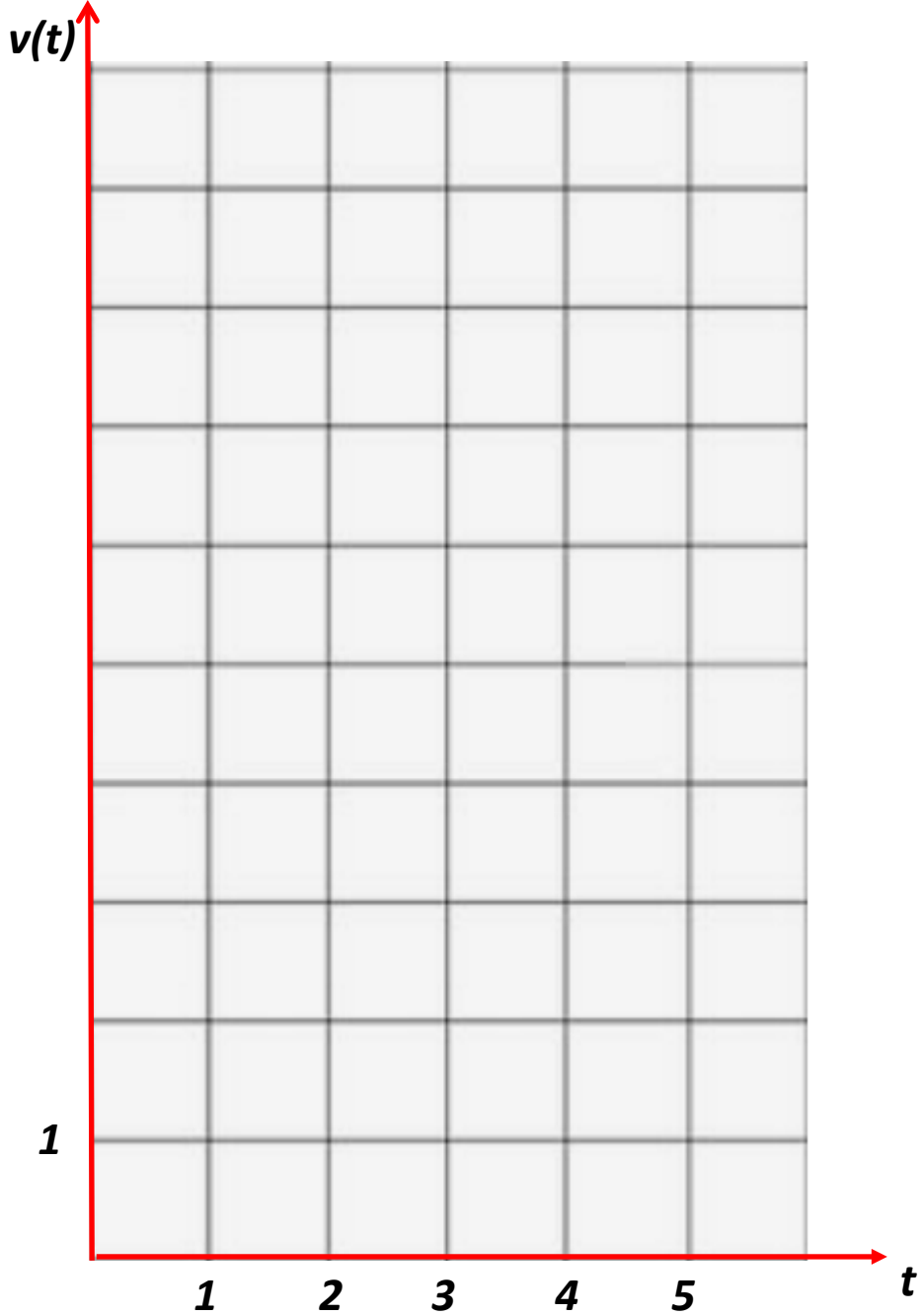

v(t)
1
t

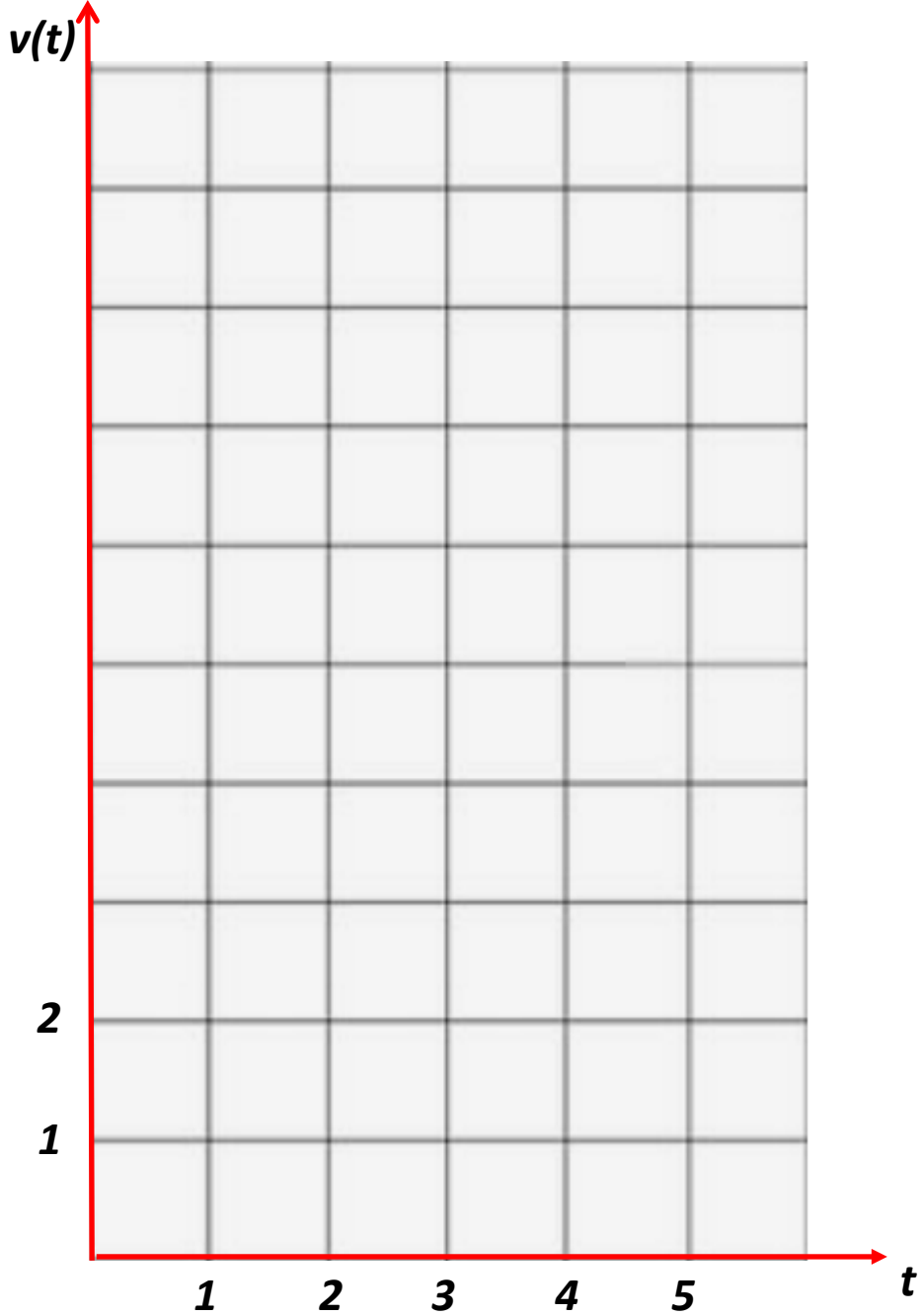

v(t)
1
2
t

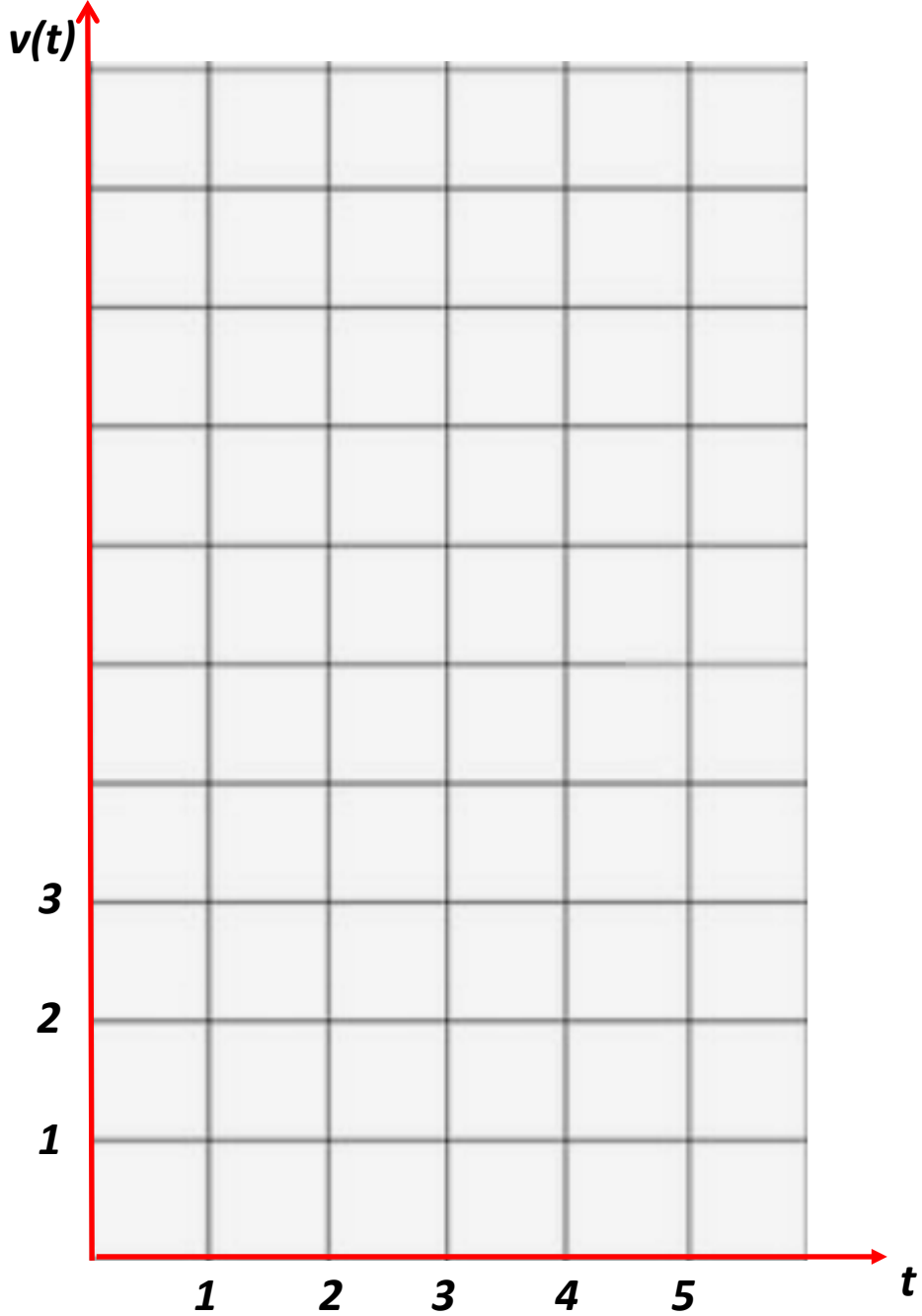

v(t)
1
2
3
t

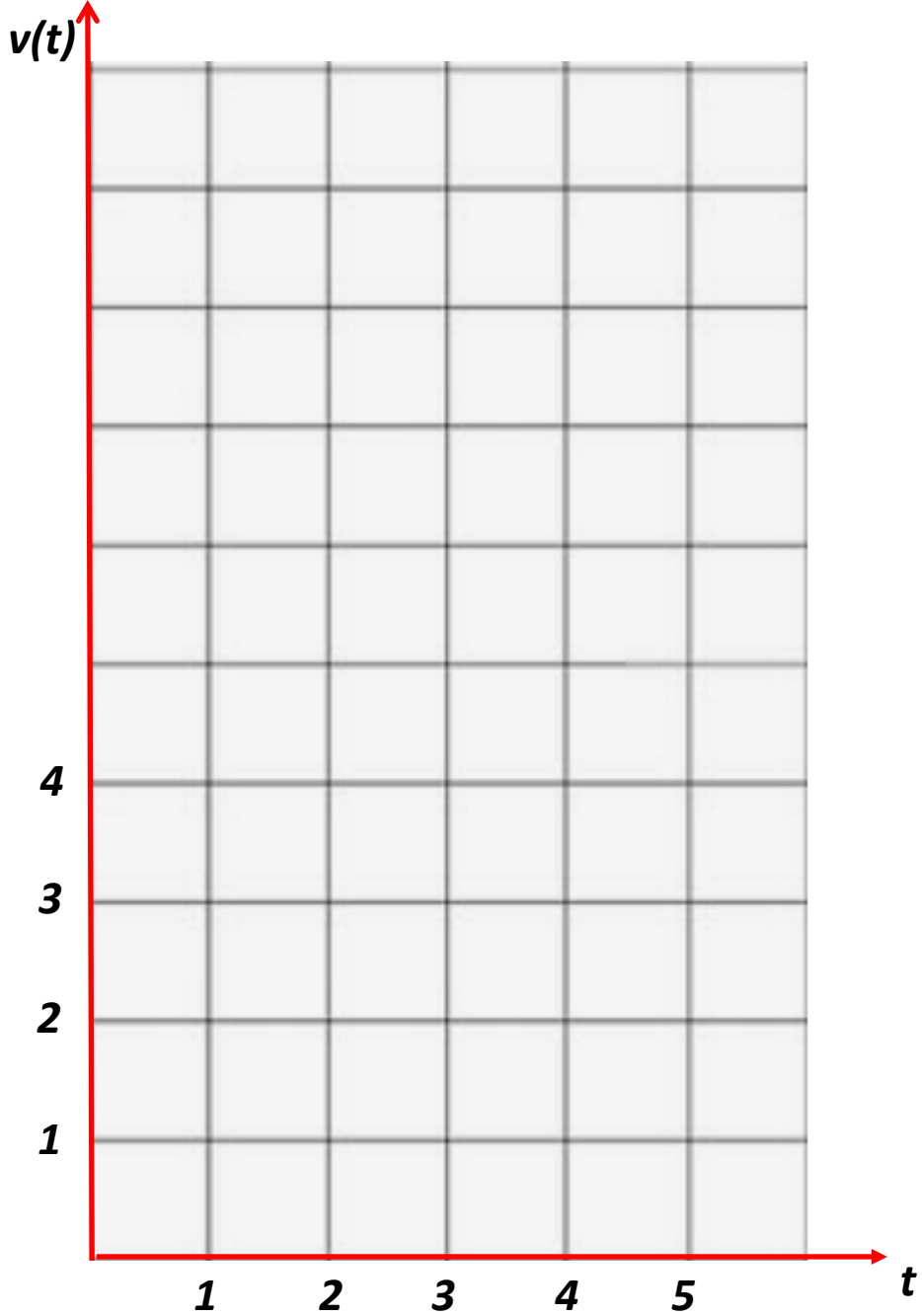

v(t)
1
2
3
4
t

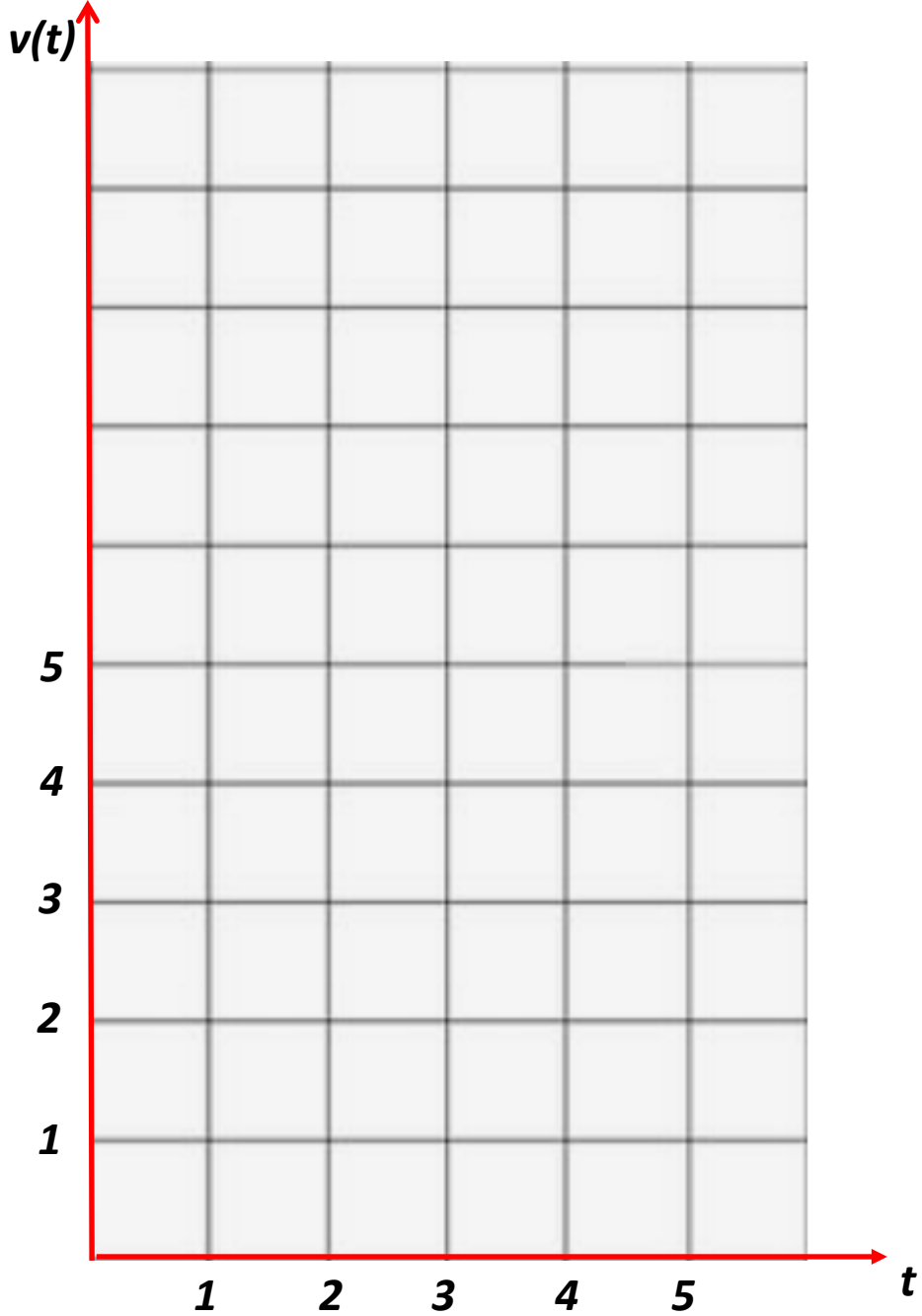

v(t)
1
2
3
4
5
t

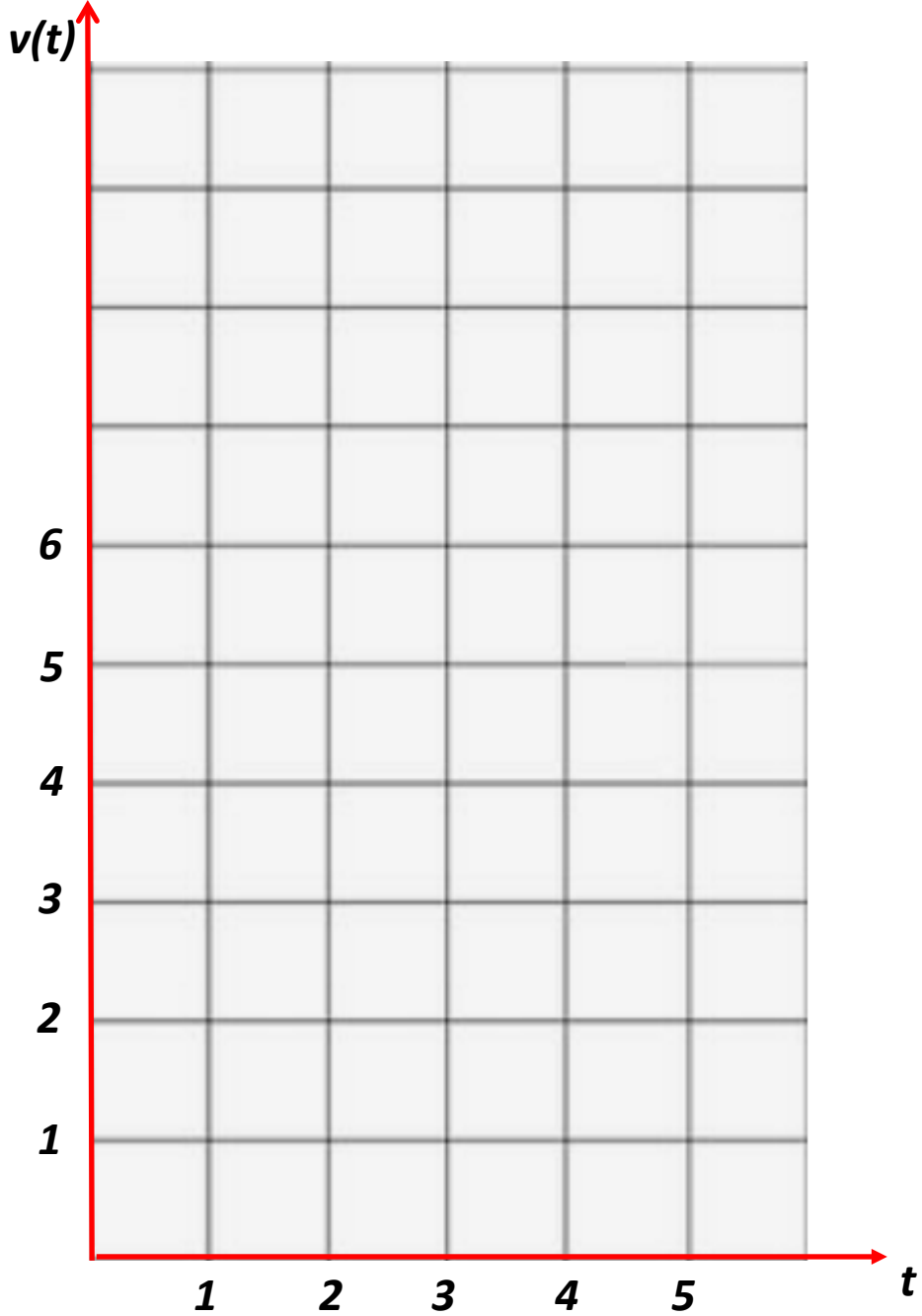

v(t)
1
1
2
3
4
5
t

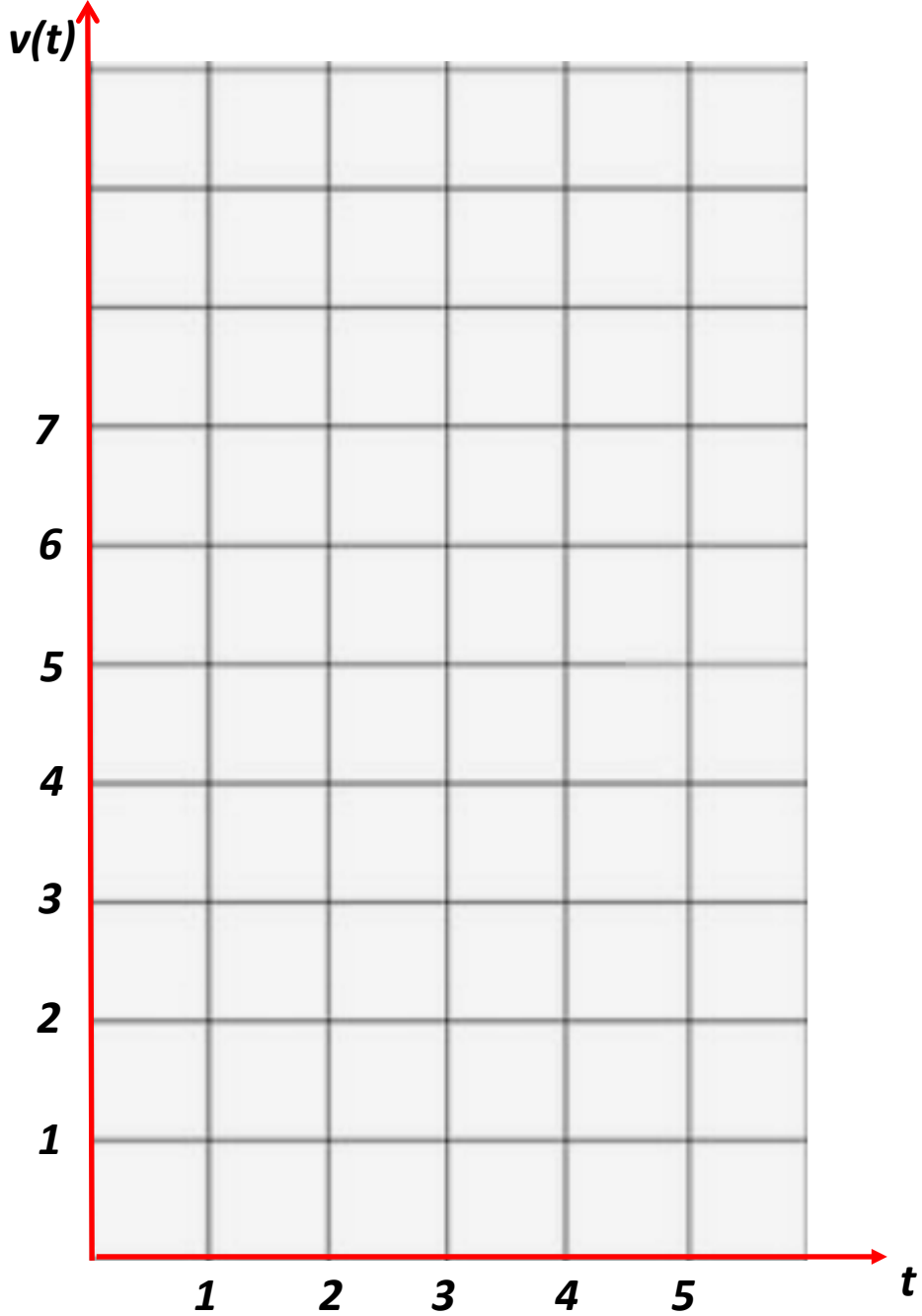

v(t)
2
1
1
2
3
4
5
t

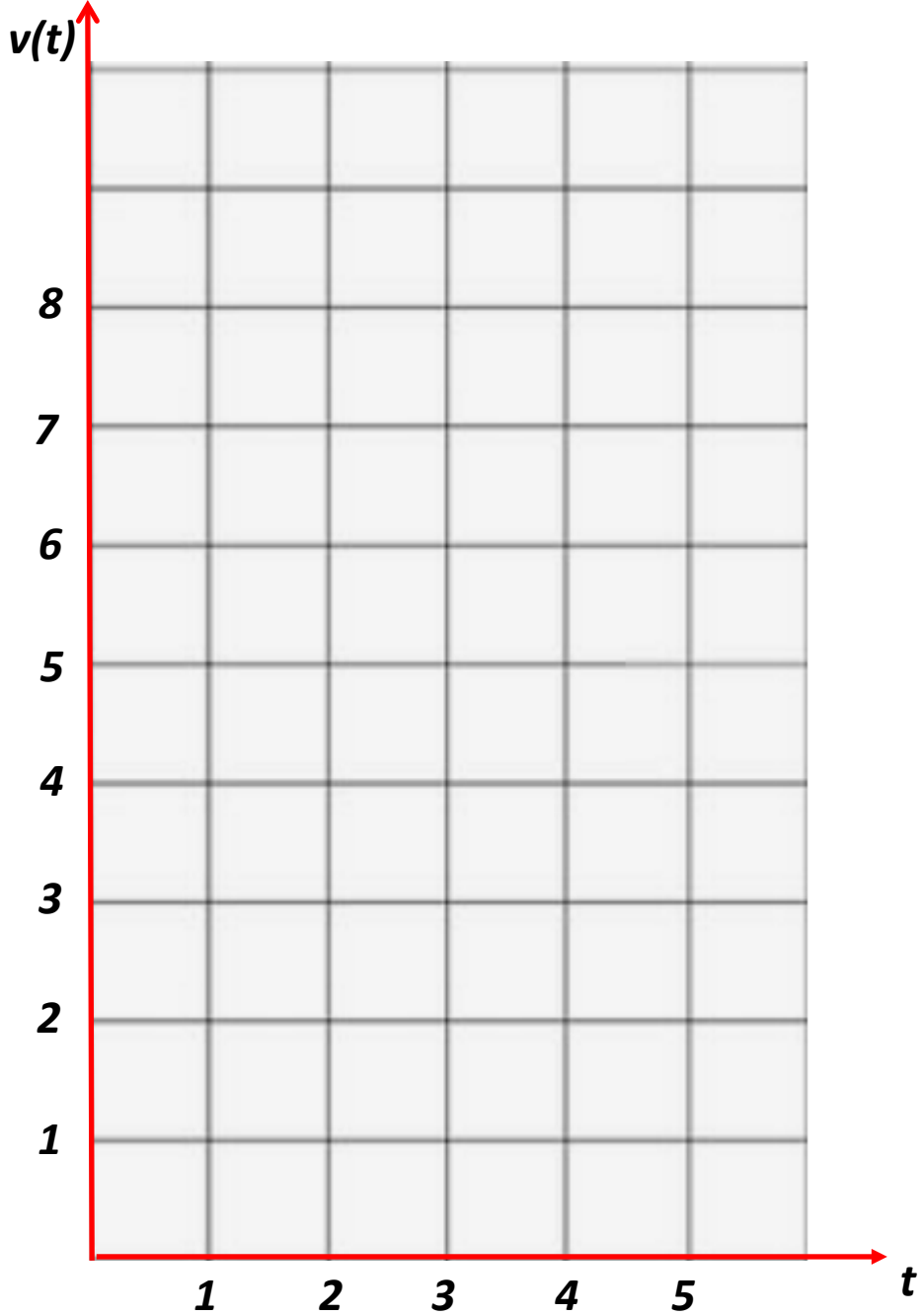

v(t)
3
2
1
1
2
3
4
5
t

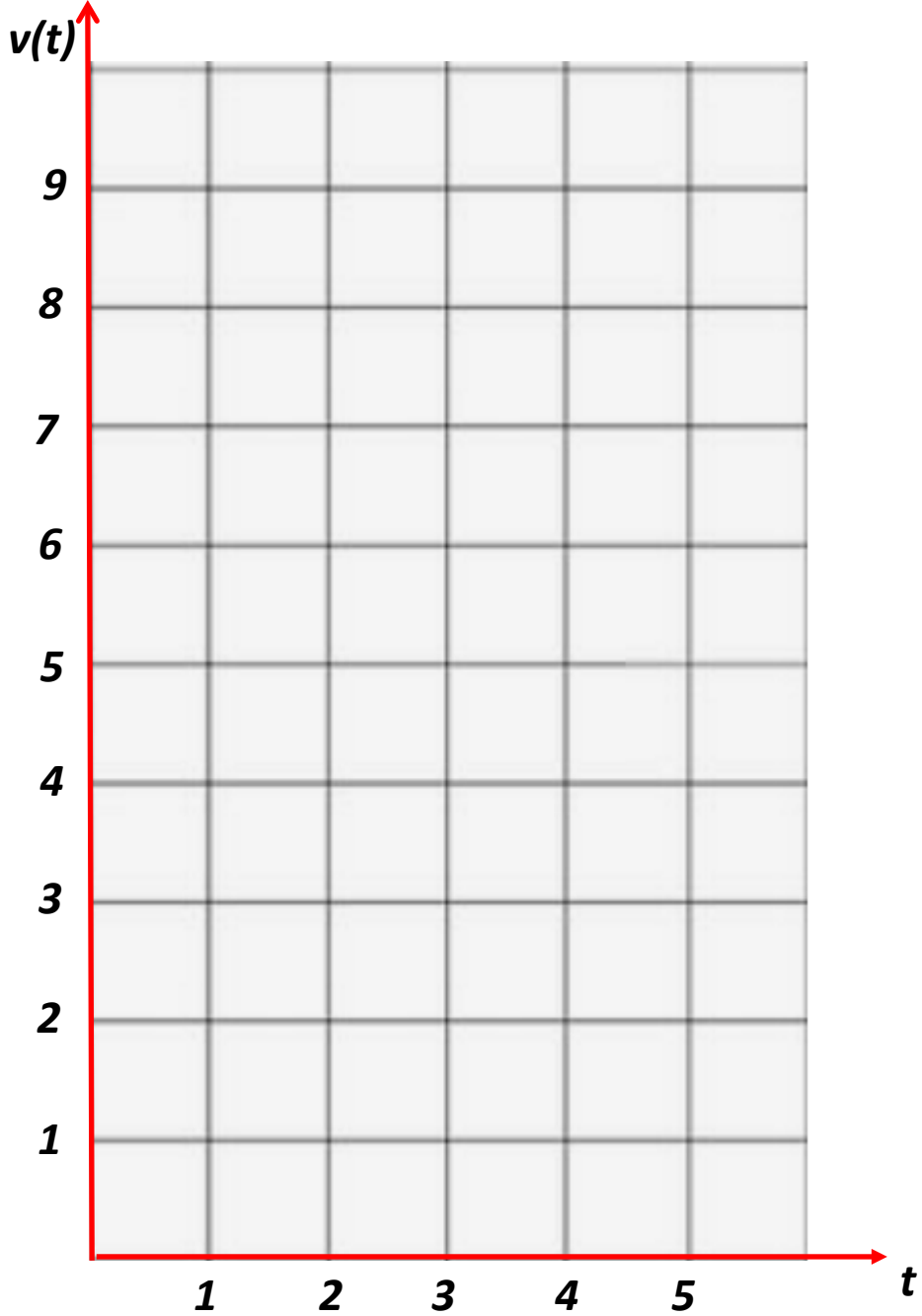

v(t)
4
3
2
1
1
2
3
4
5
t

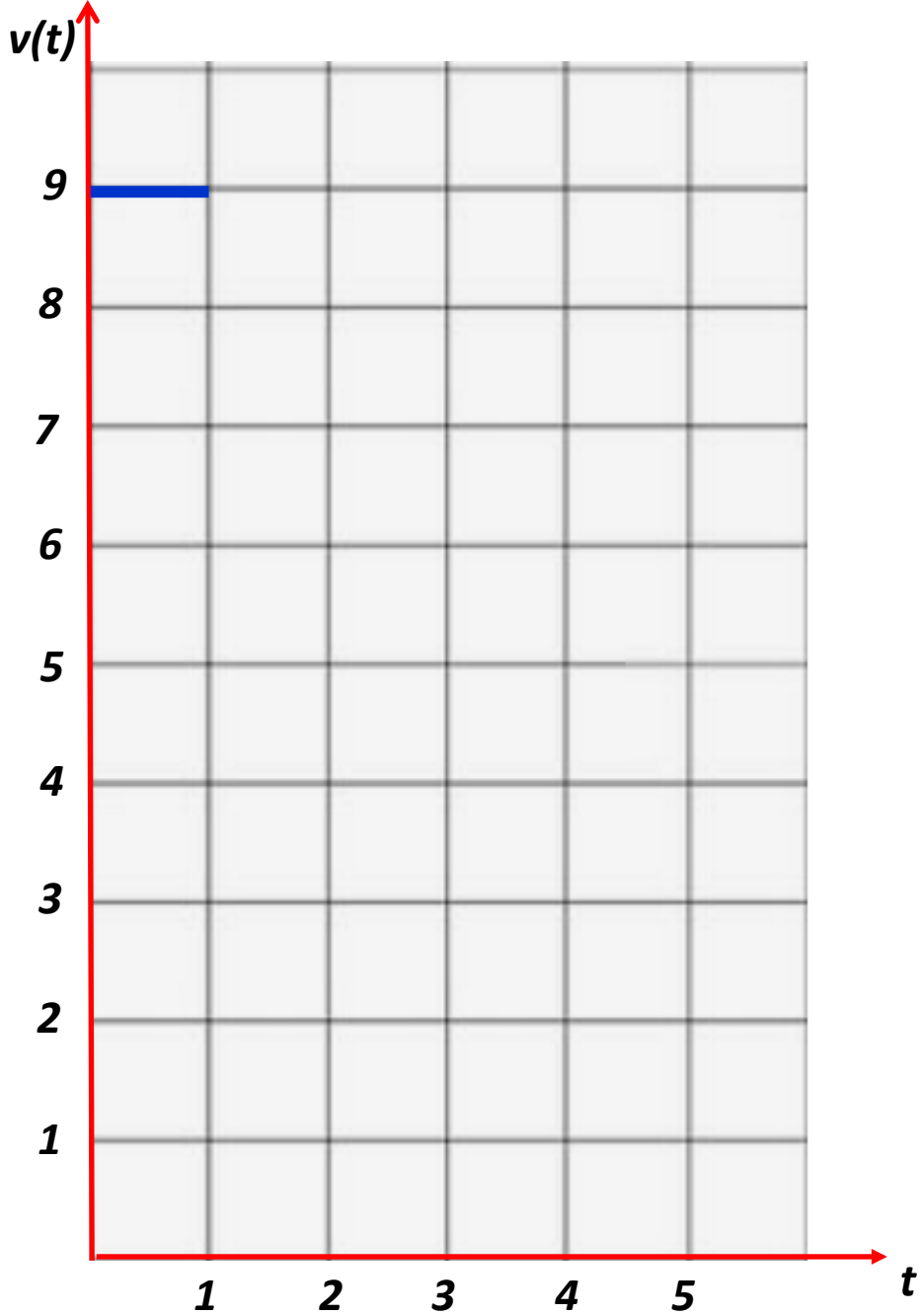

v(t)
5
4
3
2
1
1
2
3
4
5
t

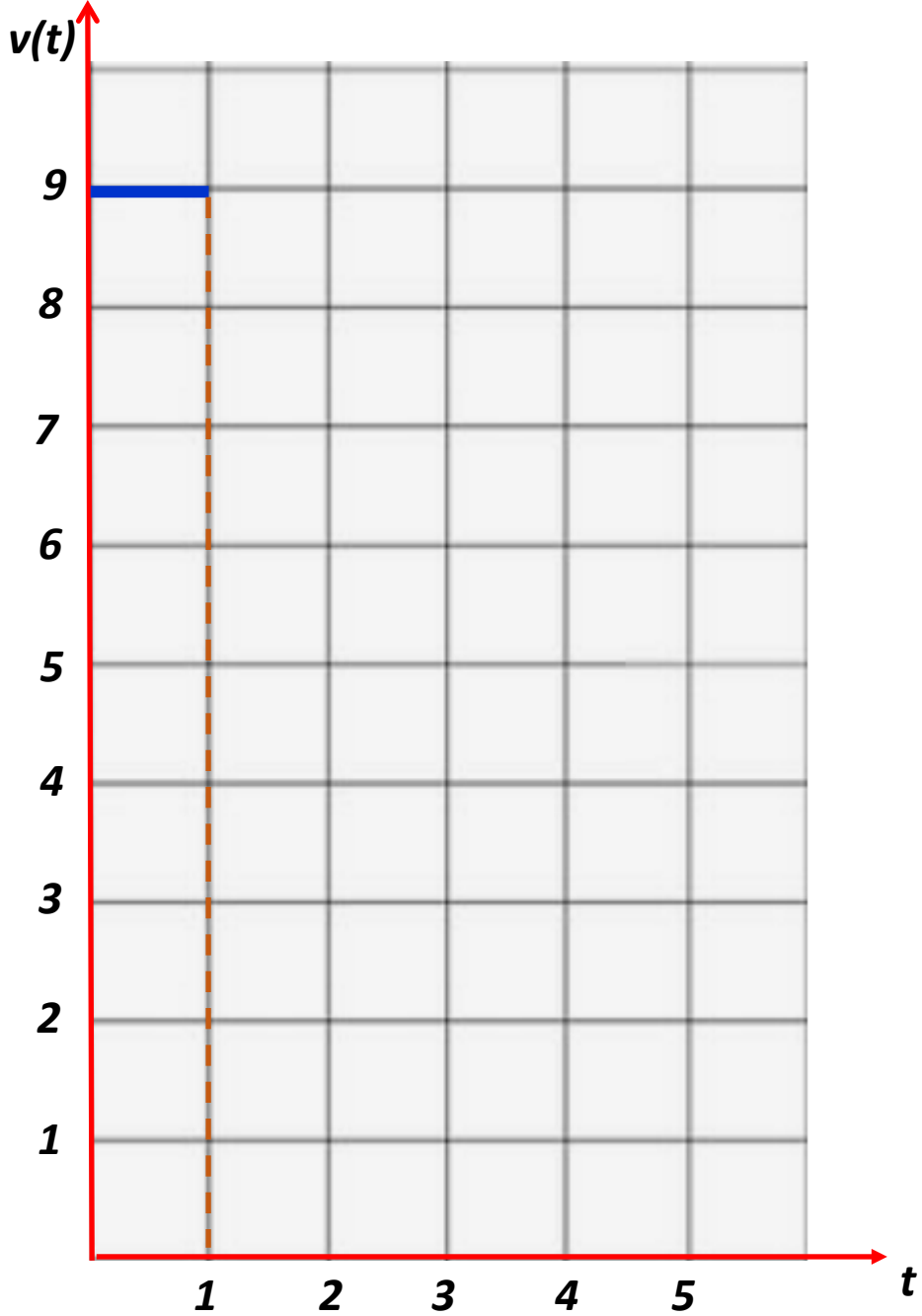

v(t)
6
5
4
3
2
1
1
2
3
4
5
t

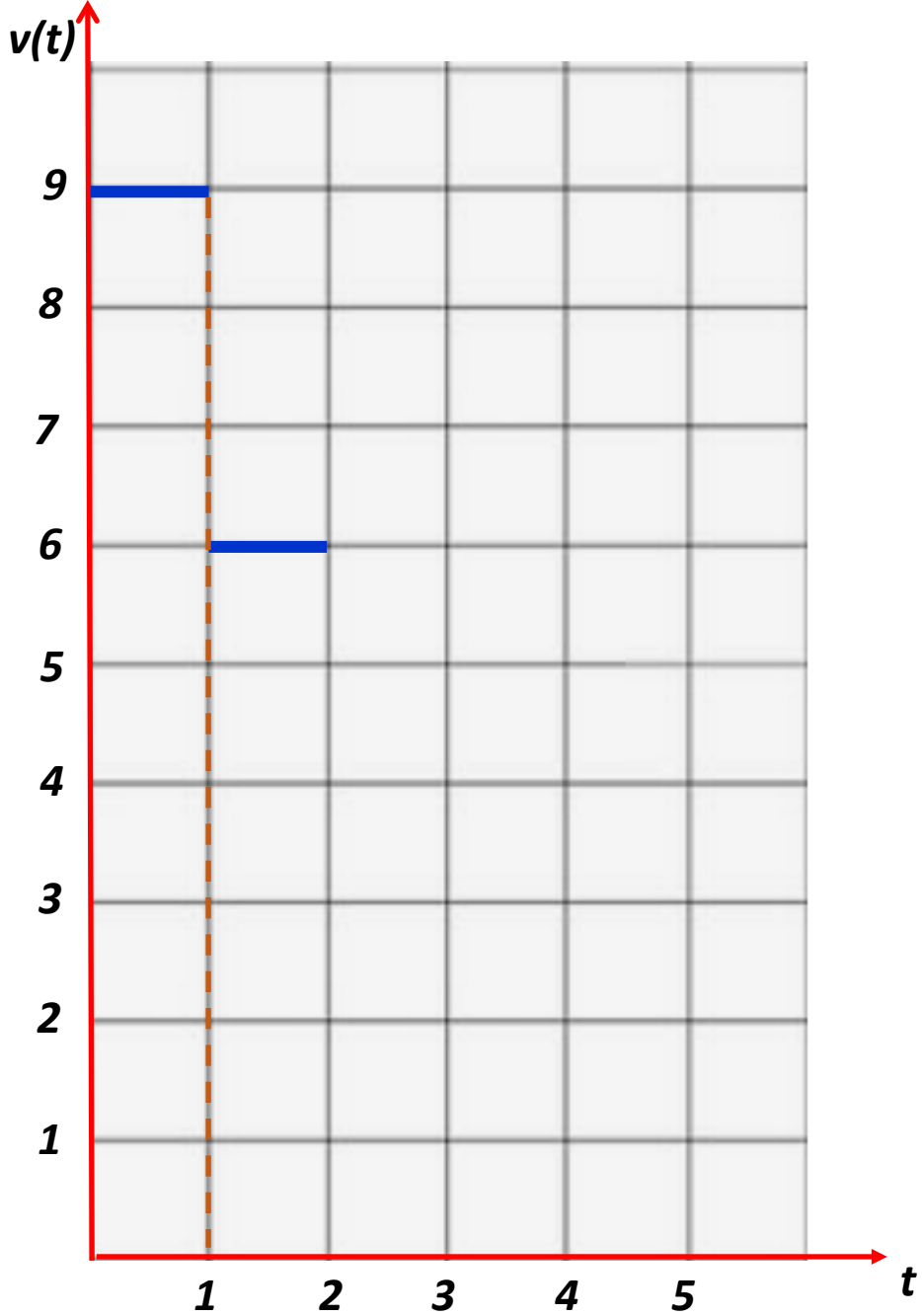

v(t)
7
6
5
4
3
2
1
1
2
3
4
5
t

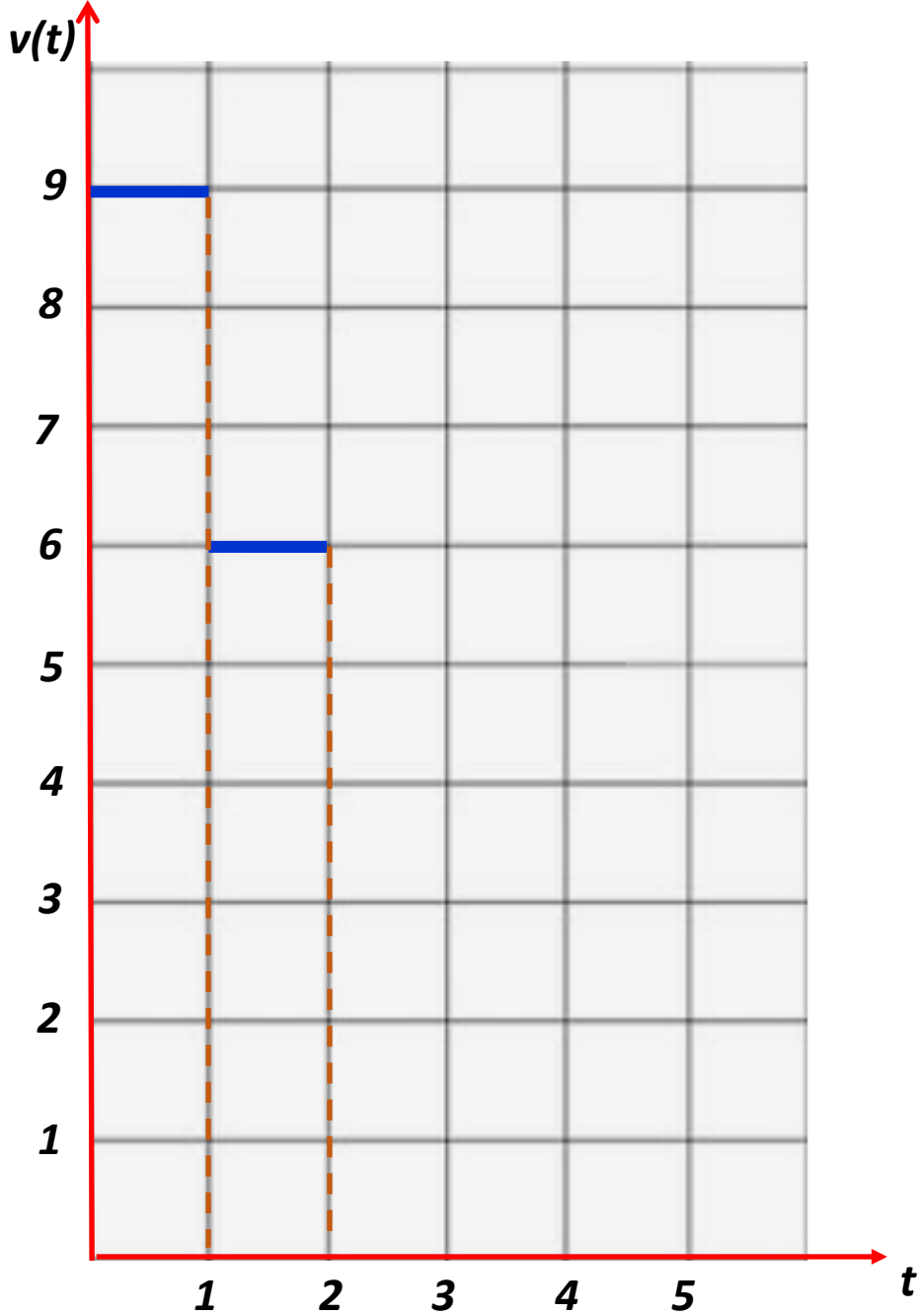

v(t)
8
7
6
5
4
3
2
1
1
2
3
4
5
t

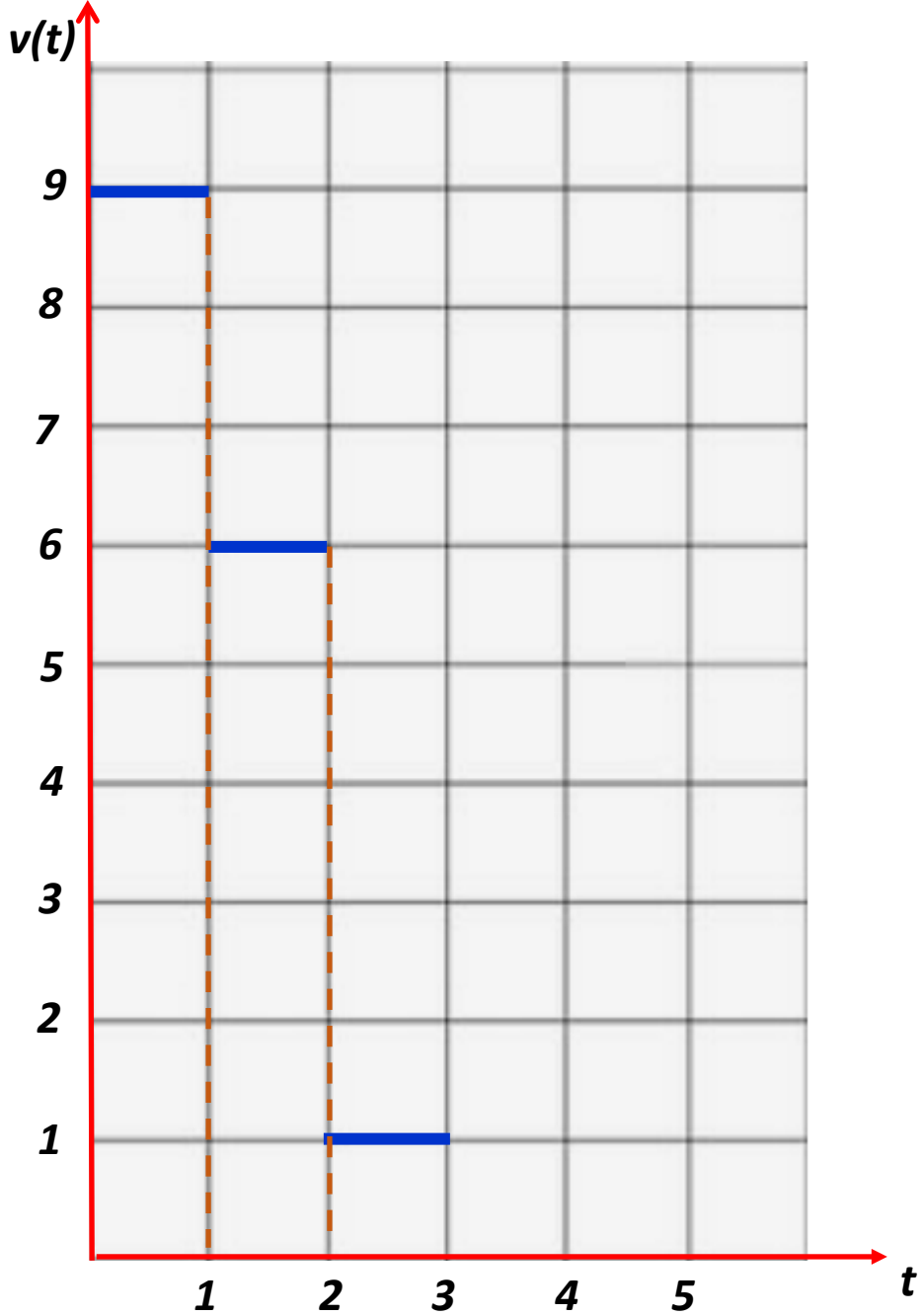

v(t)
9
8
7
6
5
4
3
2
1
1
2
3
4
5
t

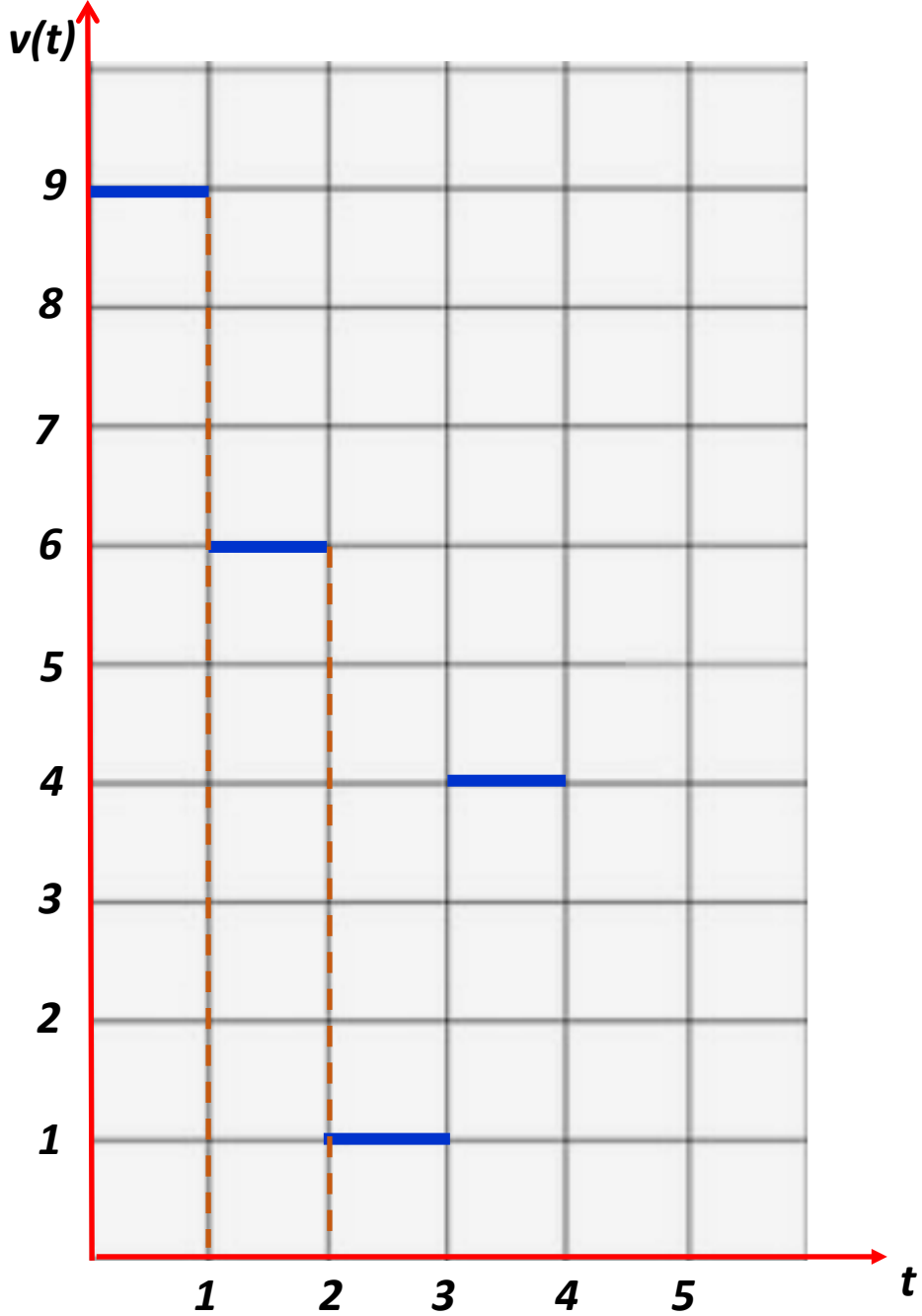

v(t)
9
8
7
6
5
4
3
2
1
1
2
3
4
5
t

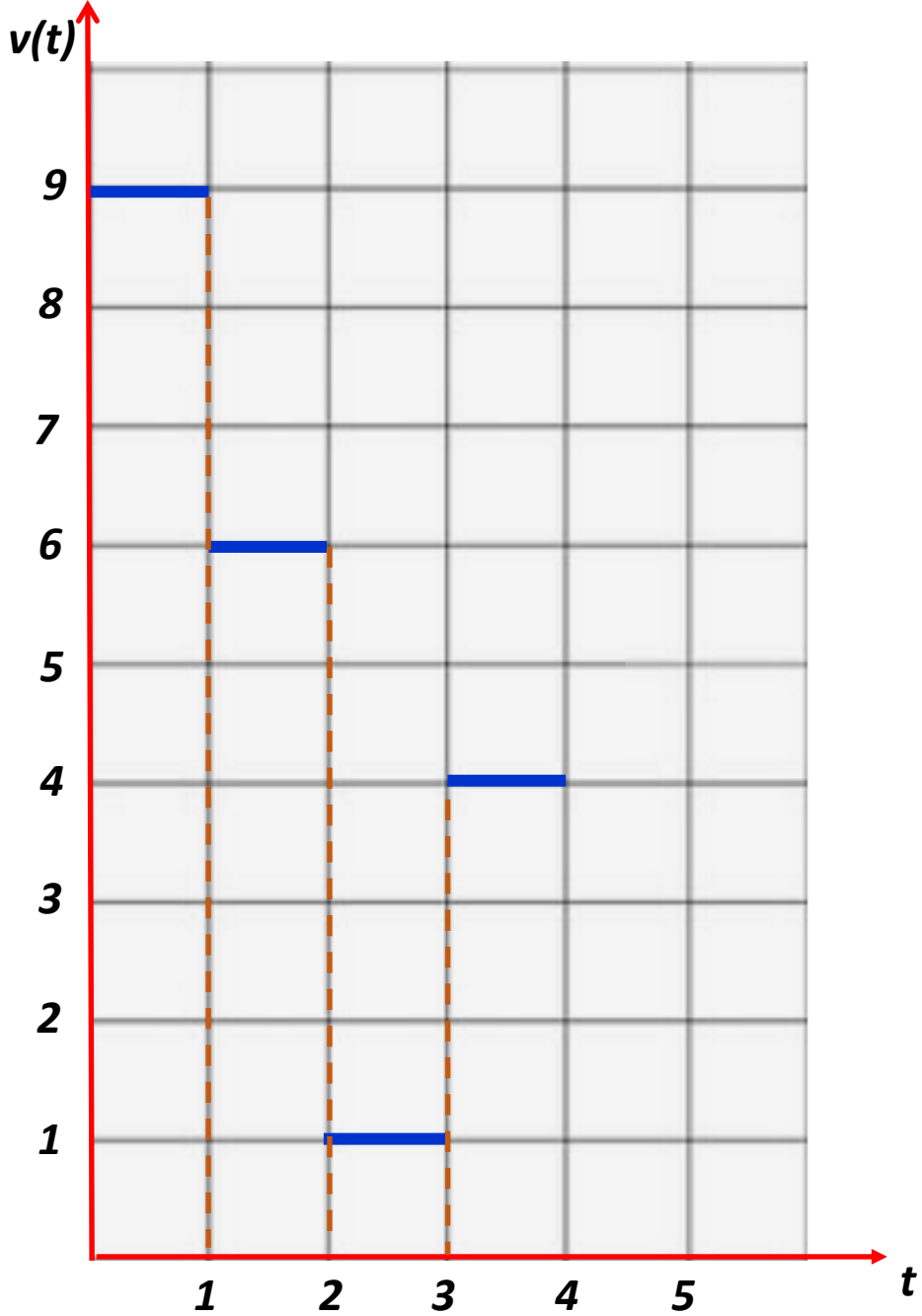

v(t)
9
8
7
6
5
4
3
2
1
1
2
3
4
5
t

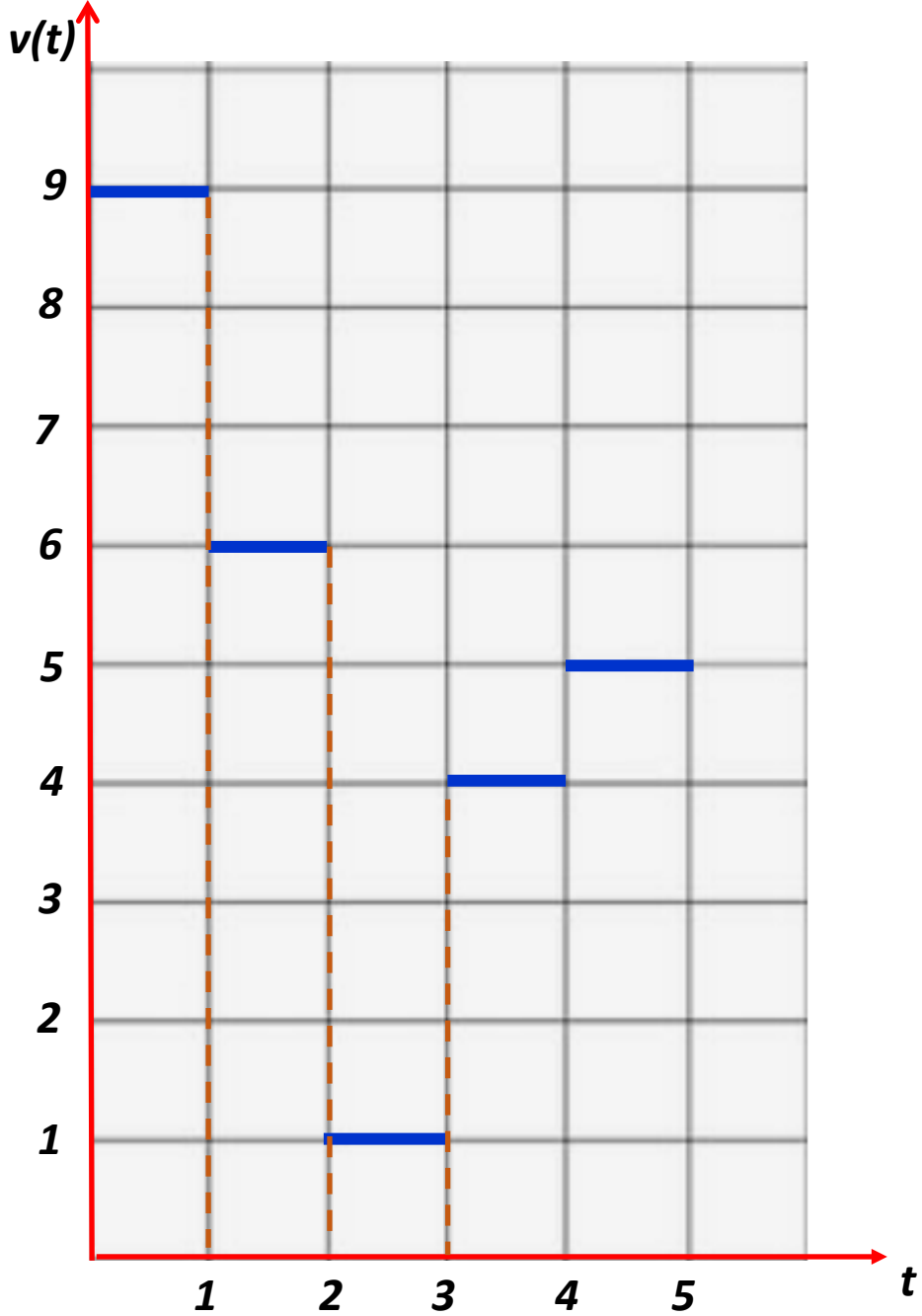

v(t)
9
8
7
6
5
4
3
2
1
1
2
3
4
5
t

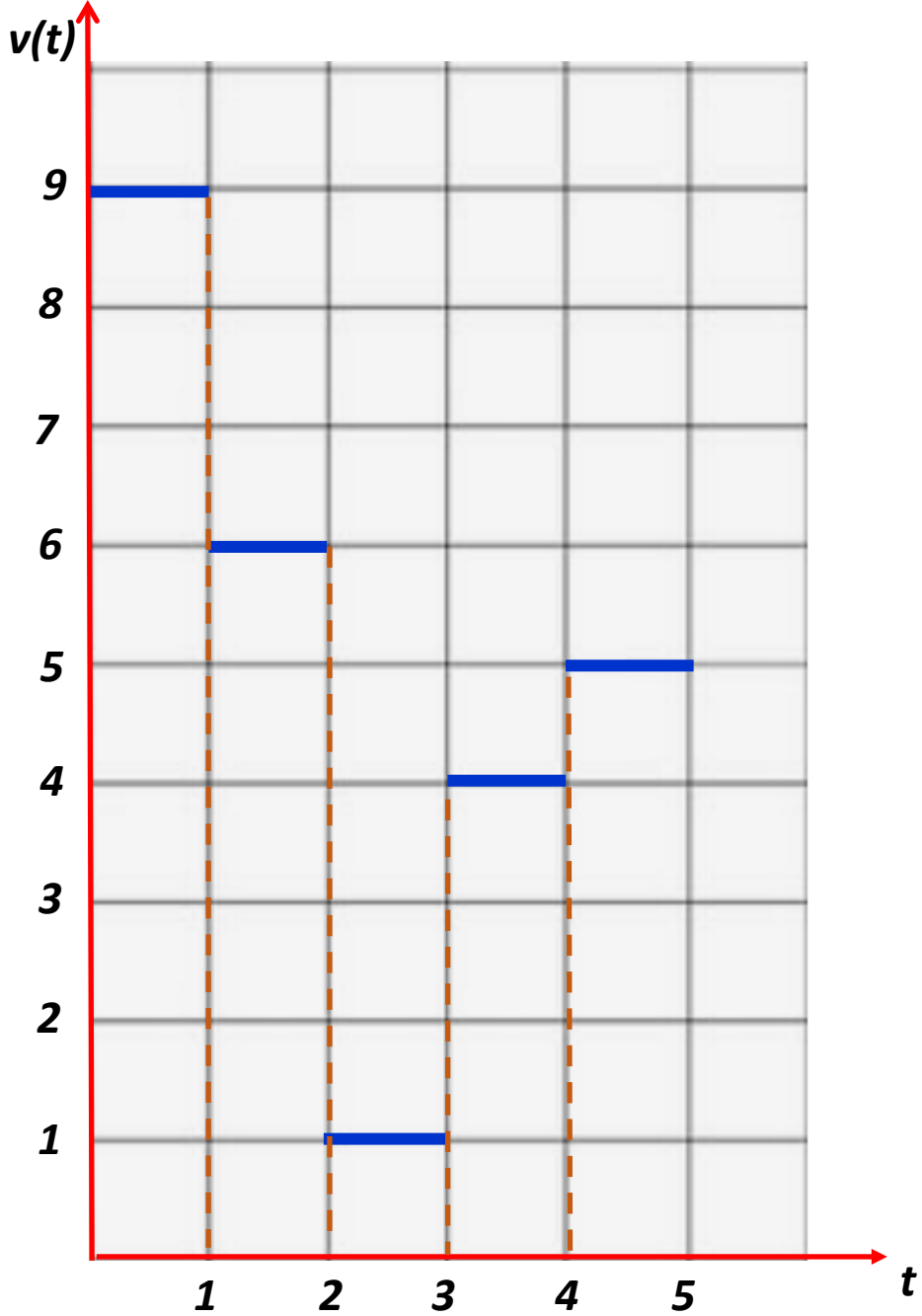

v(t)
9
8
7
6
5
4
3
2
1
1
2
3
4
5
t

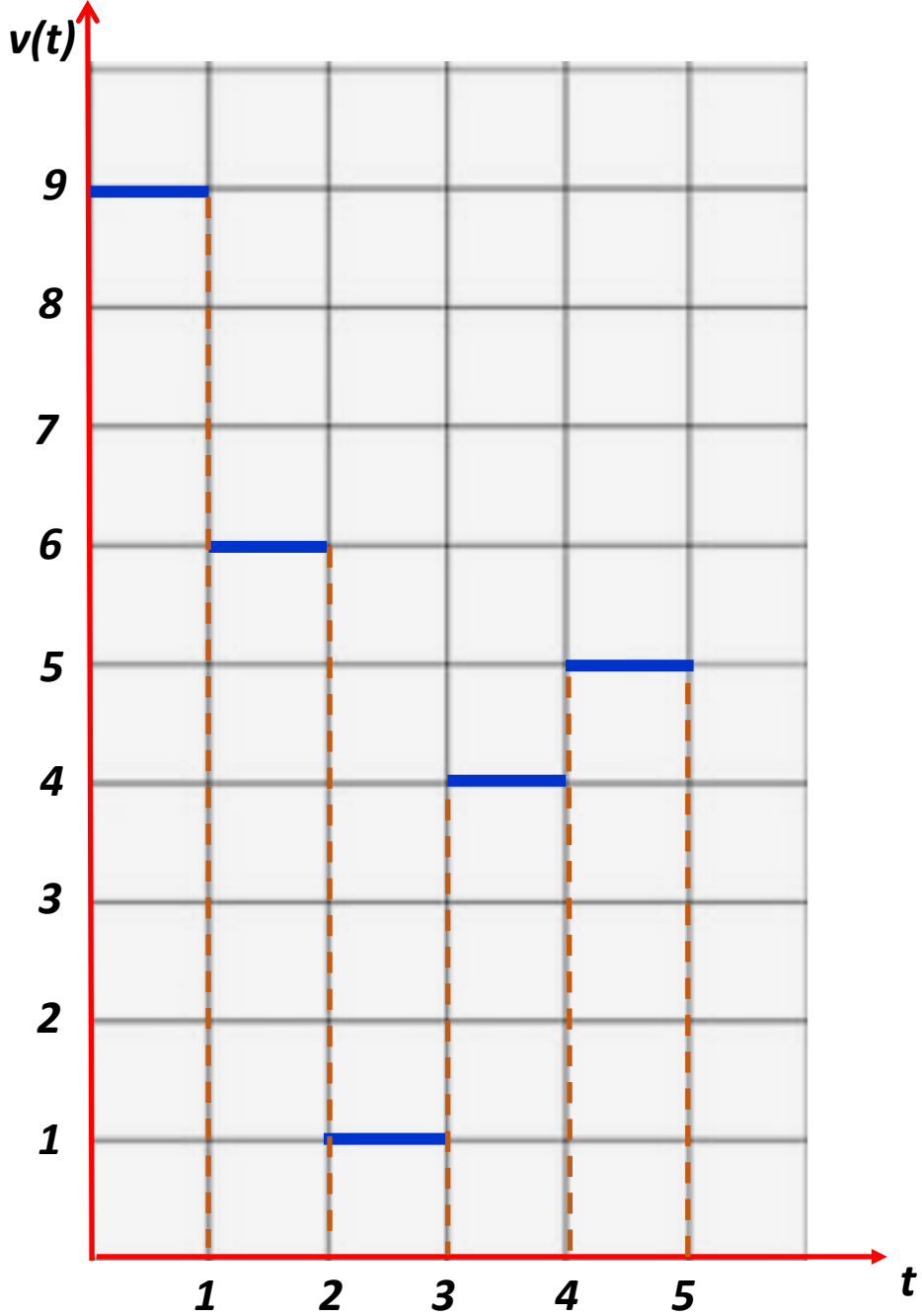

v(t)
9
8
7
6
5
4
3
2
1
1
2
3
4
5
t

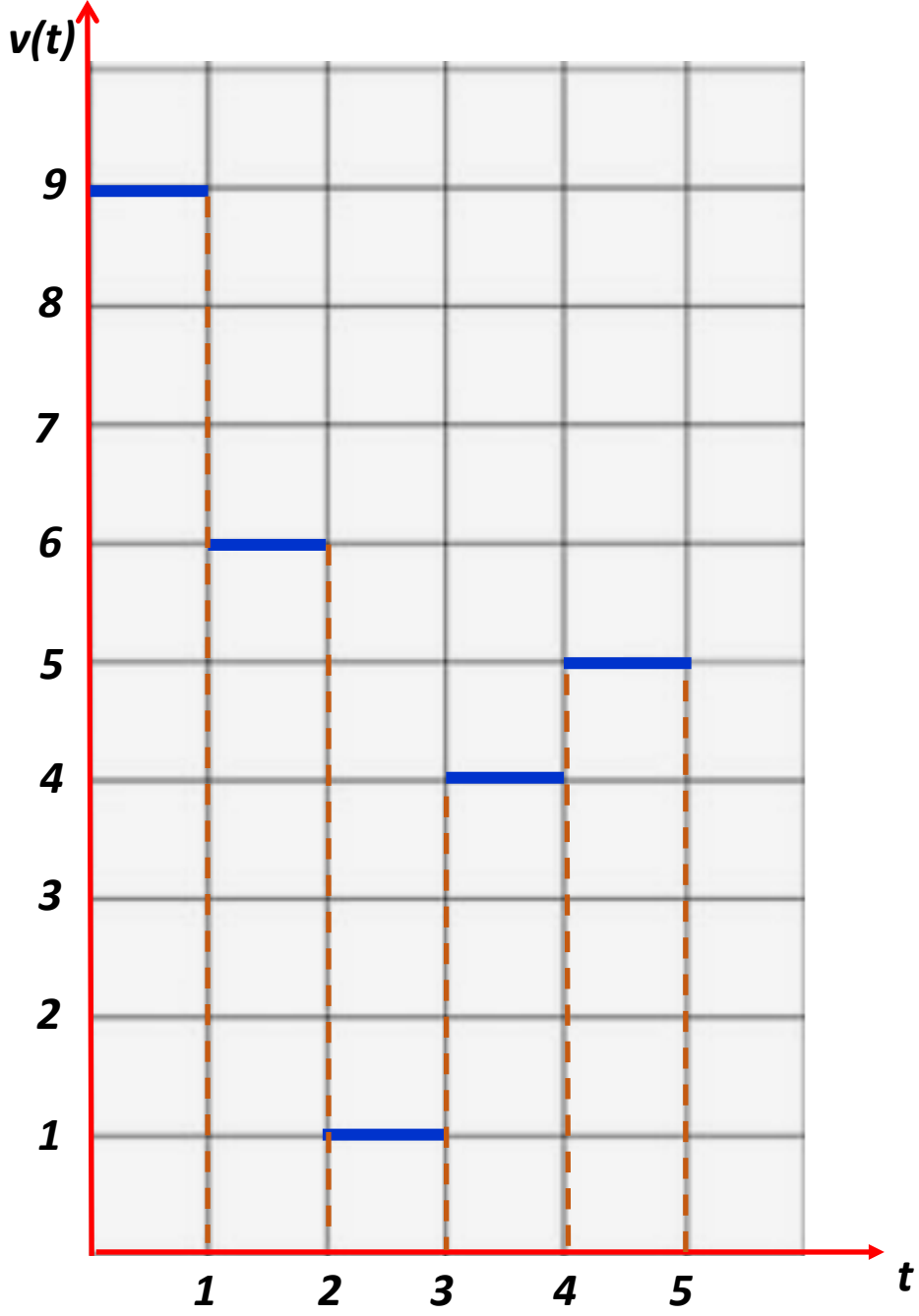

v(t)
9
8
7
6
5
4
3
2
1
1
2
3
4
5
t


v(t)
9
8
7
6
5
4
3
2
1
1
2
3
4
5
t


v(t)
9
8
7
6
5
4
3
2
1
1
2
3
4
5
t

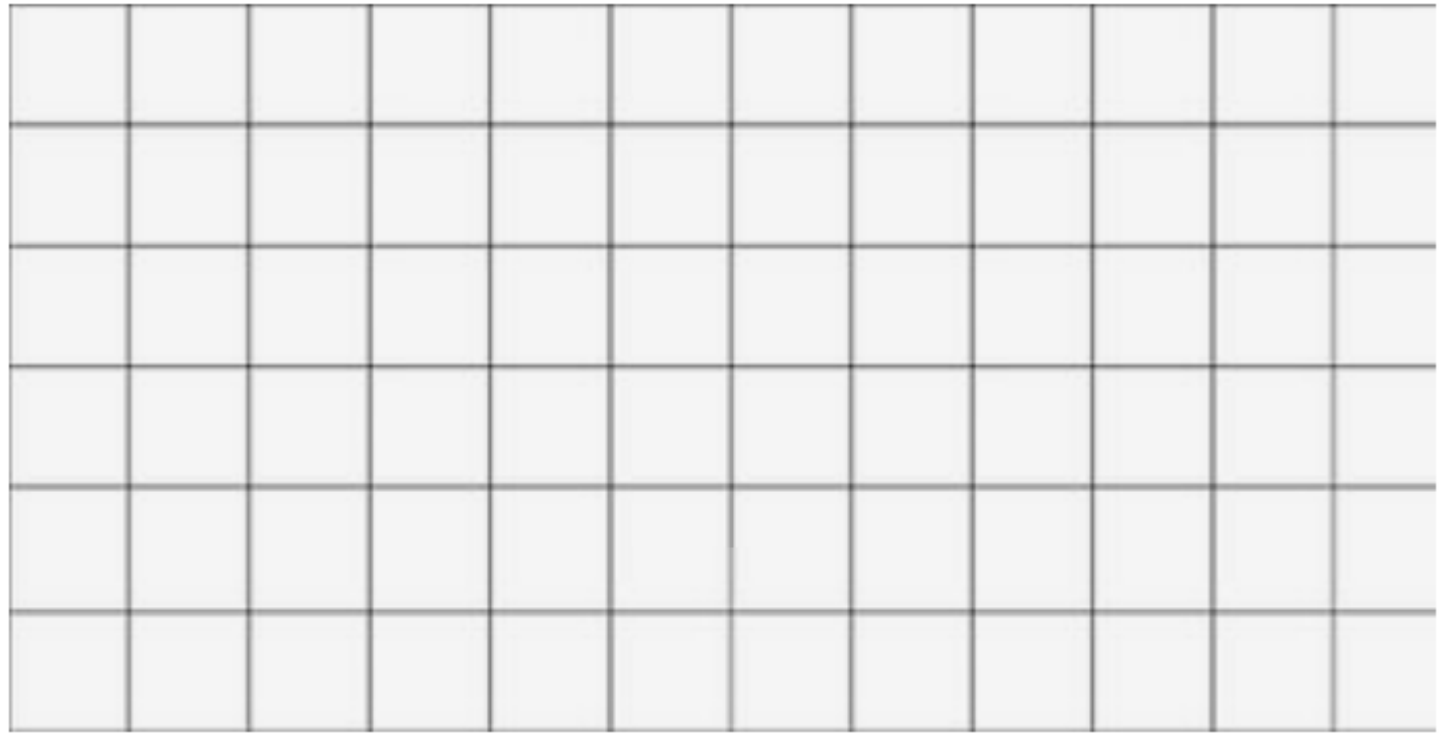

v(t)
9
8
7
6
5
4
3
2
1
1
2
3
4
5
t

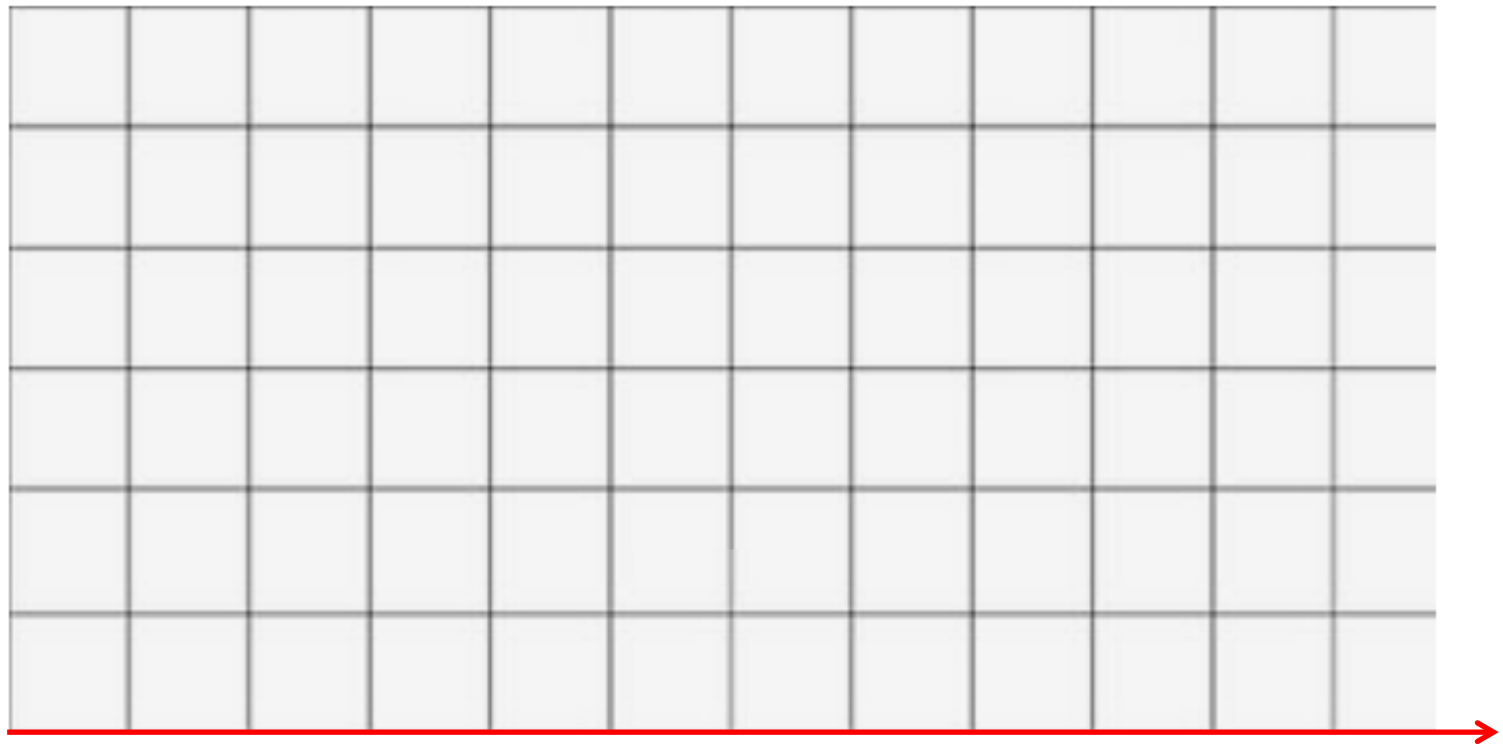

v(t)
9
8
7
6
5
4
3
2
1
1
2
3
4
5
t

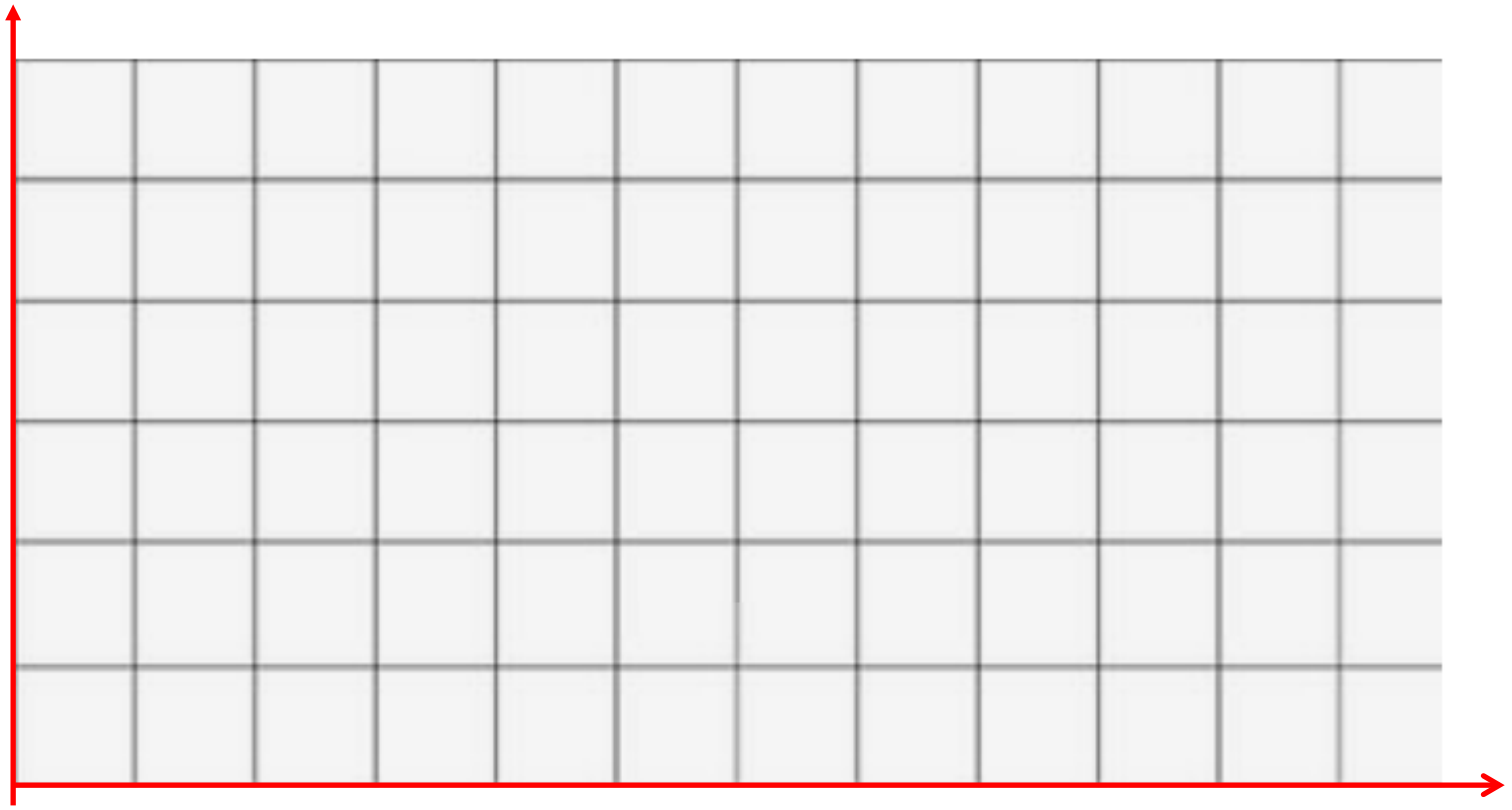


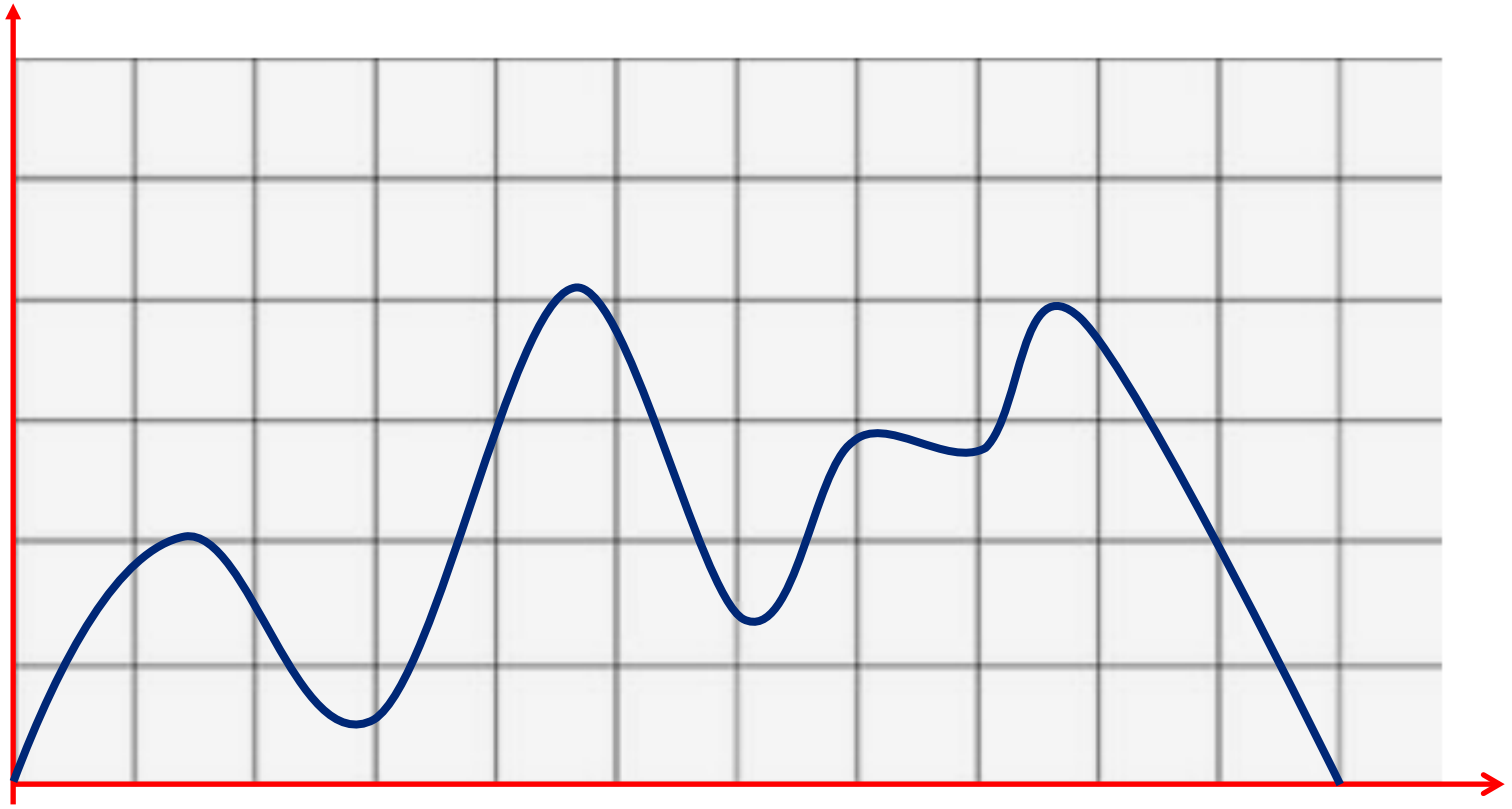

$$V_{prom} = \frac{9+6+1+4+5}{5} = 5$$

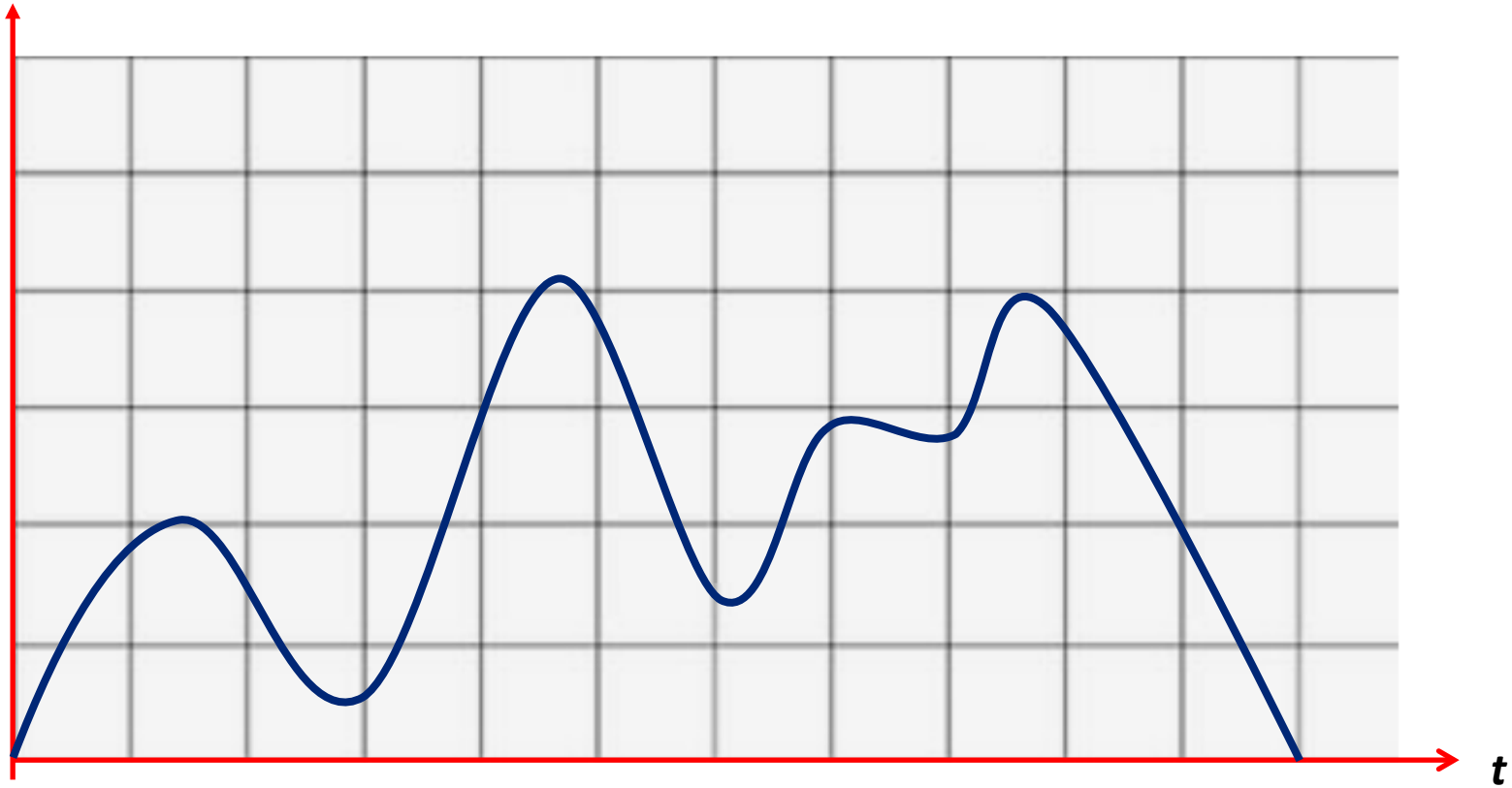
*Ejemplo*
*Señal* 3

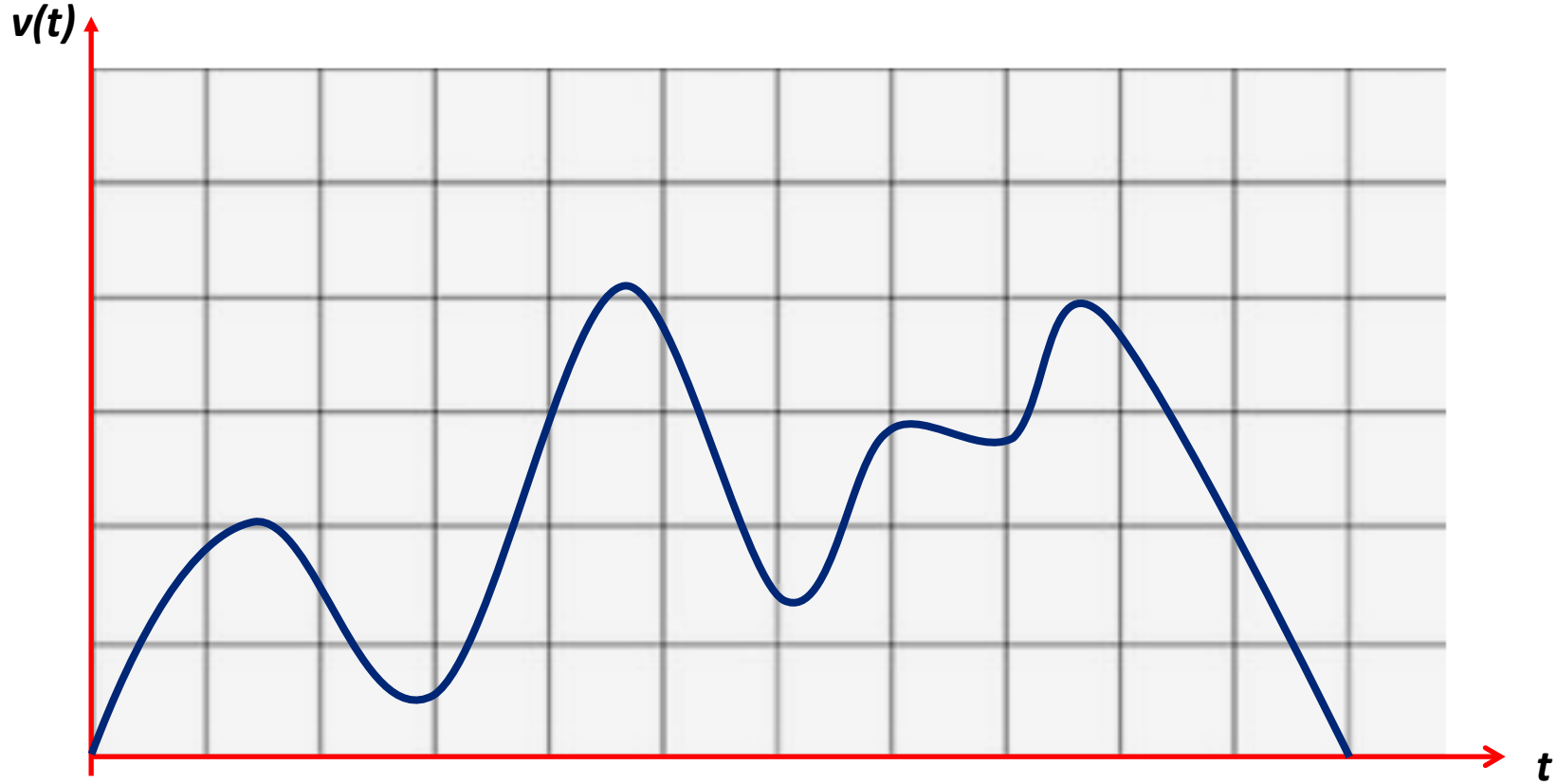


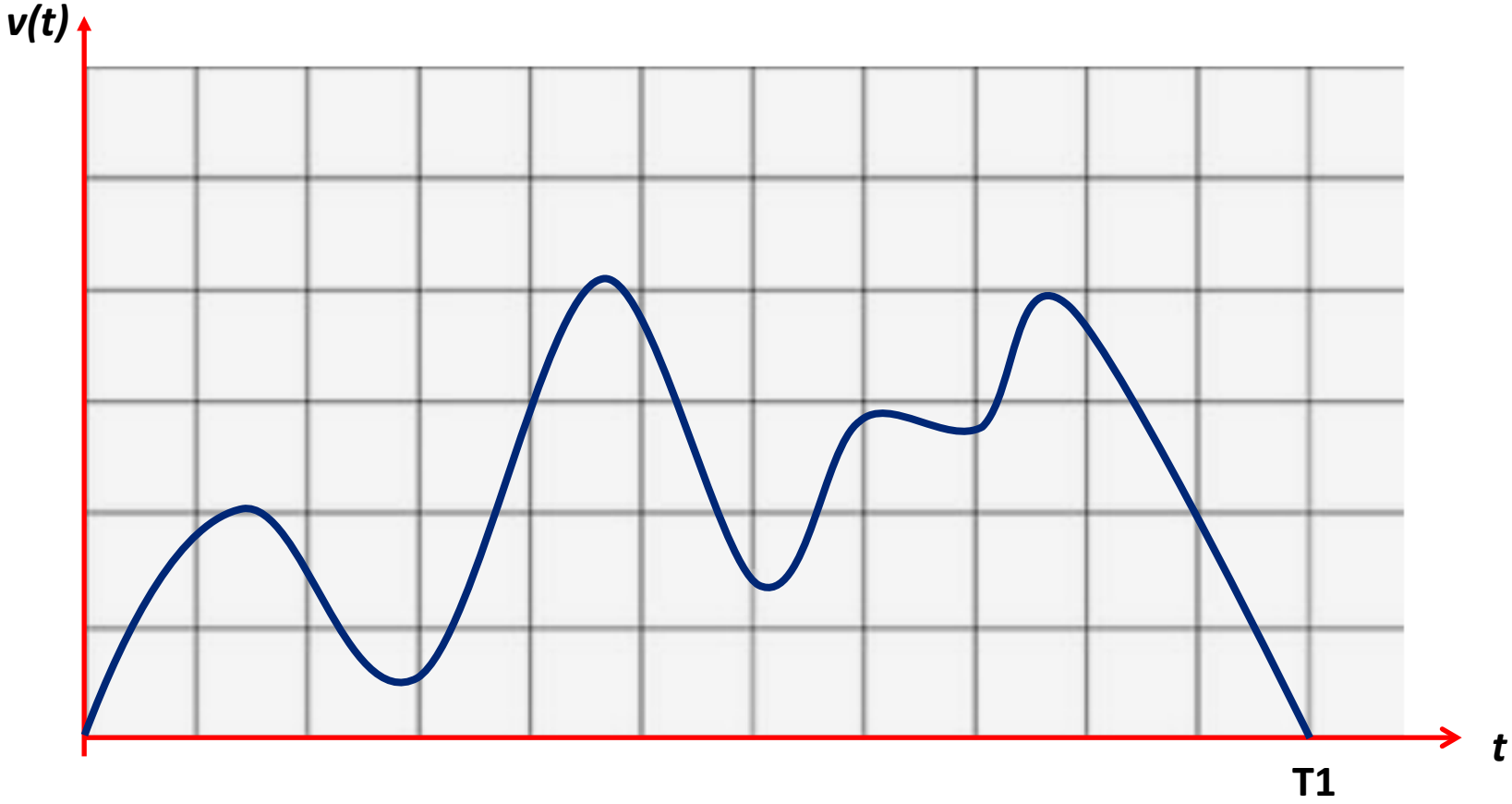


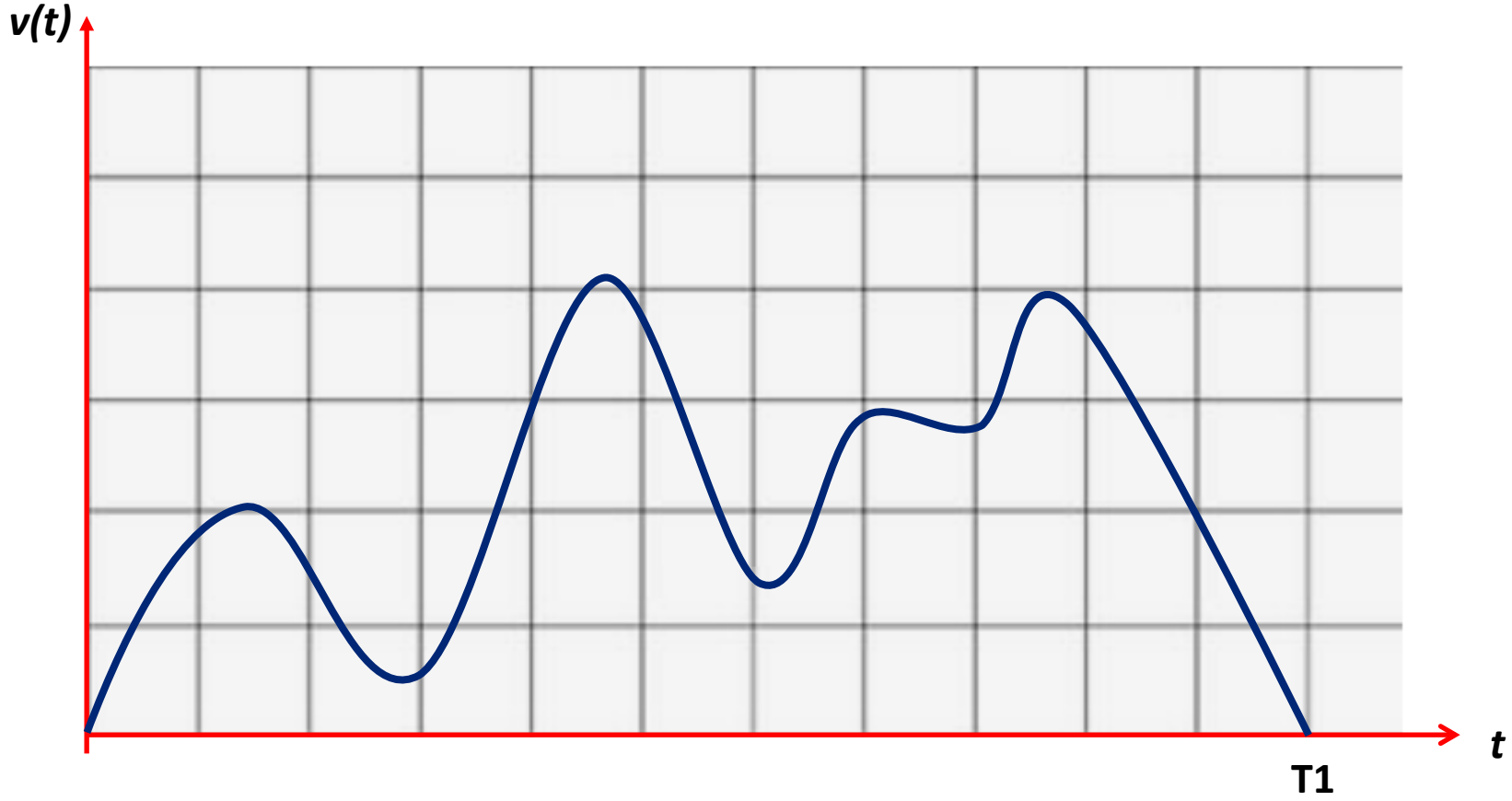





t

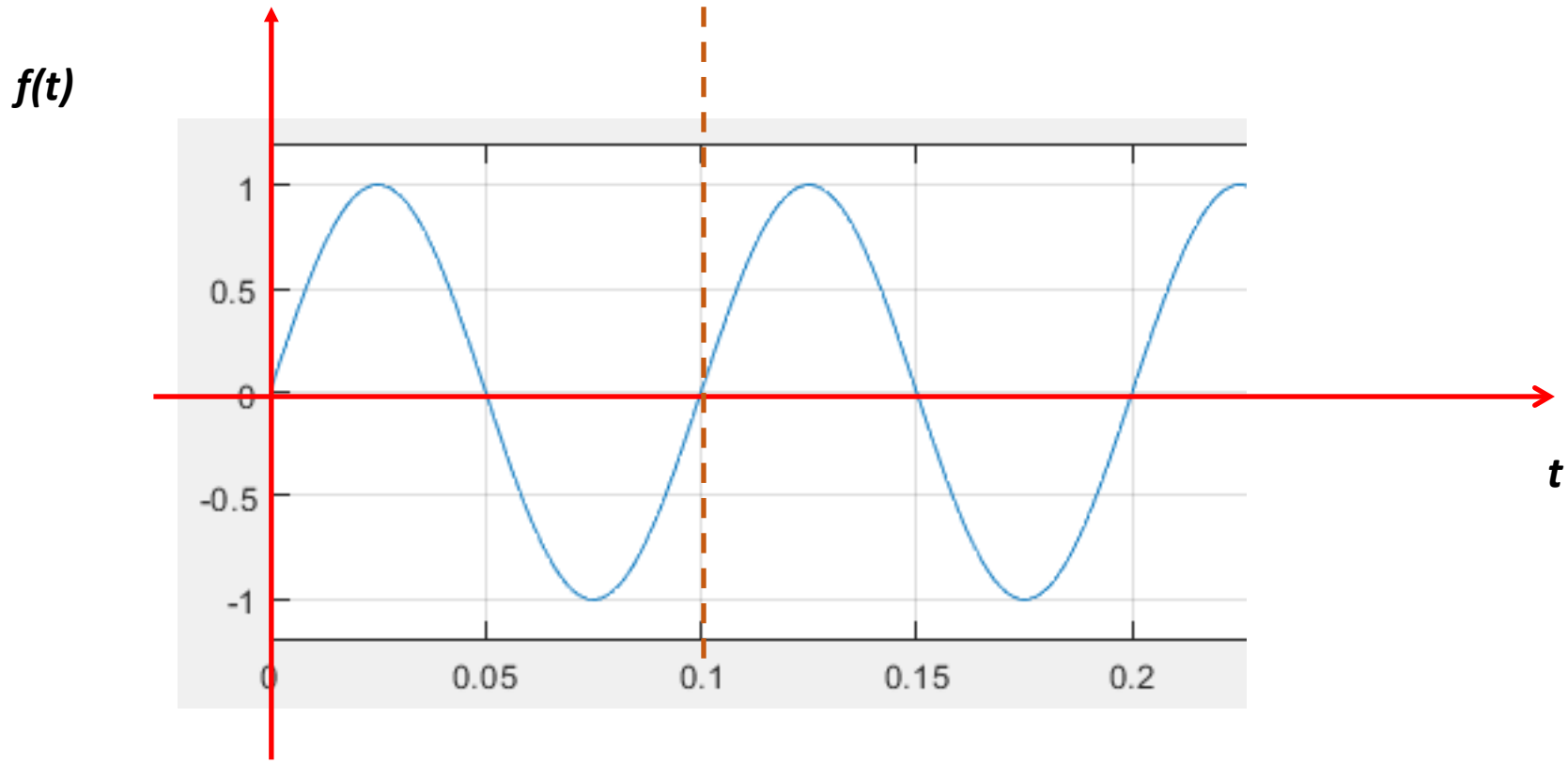

v(t)
t


v(t)
t
T1

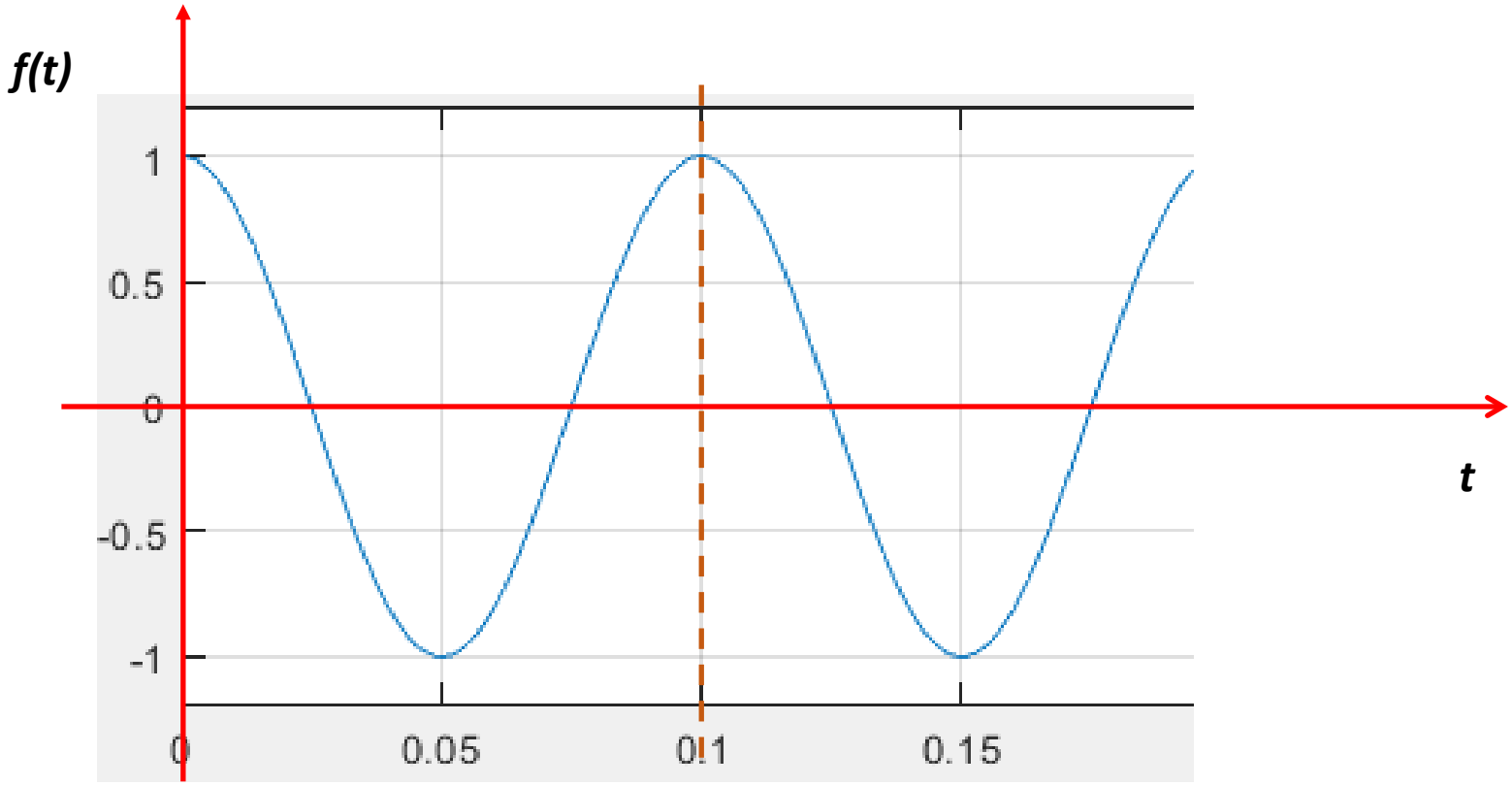



$$V_{prom} = \frac{\int_0^{T_1} v(t)dt}{T_1}$$

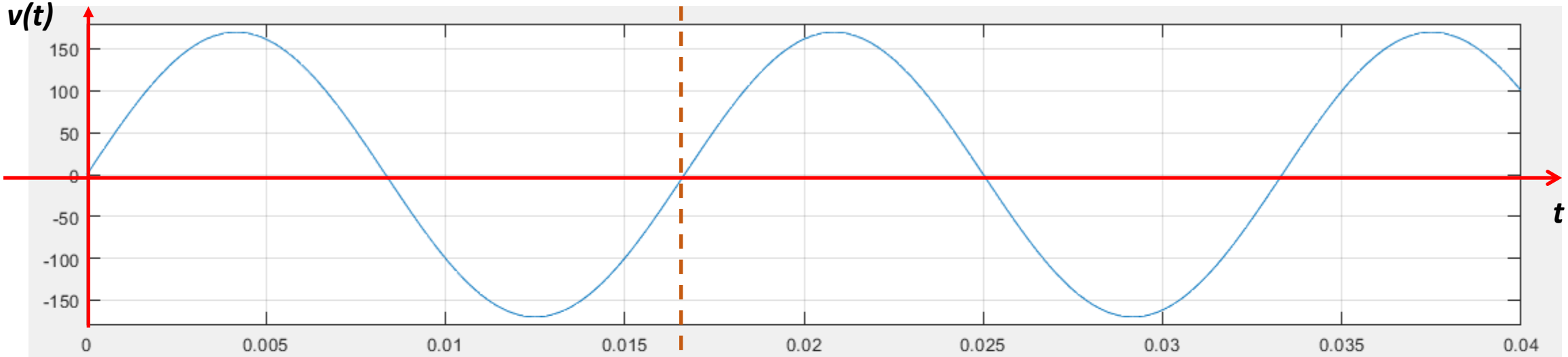
*Ejemplo*
*Señal* 4

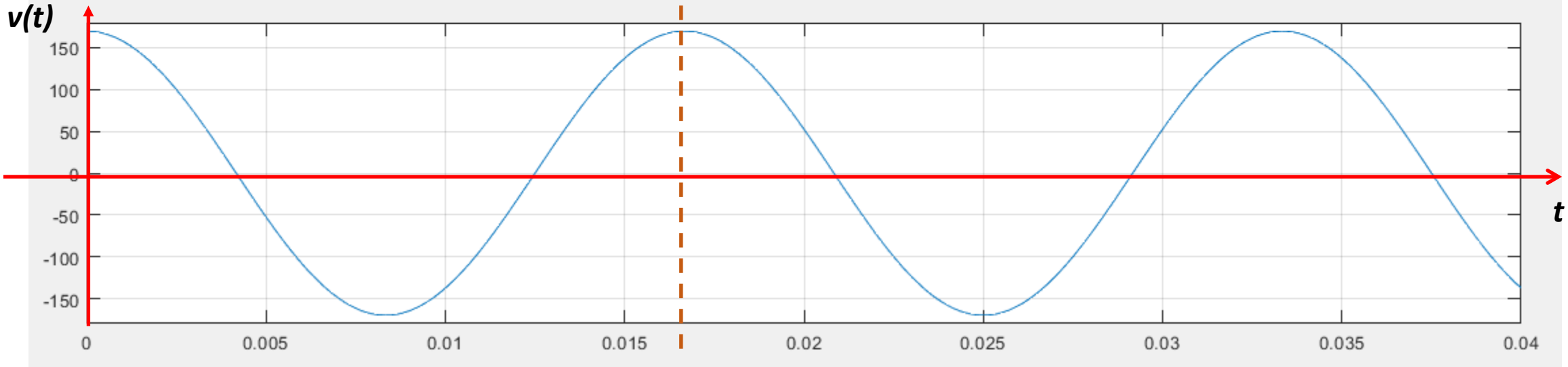



$$V_{prom} = 0$$

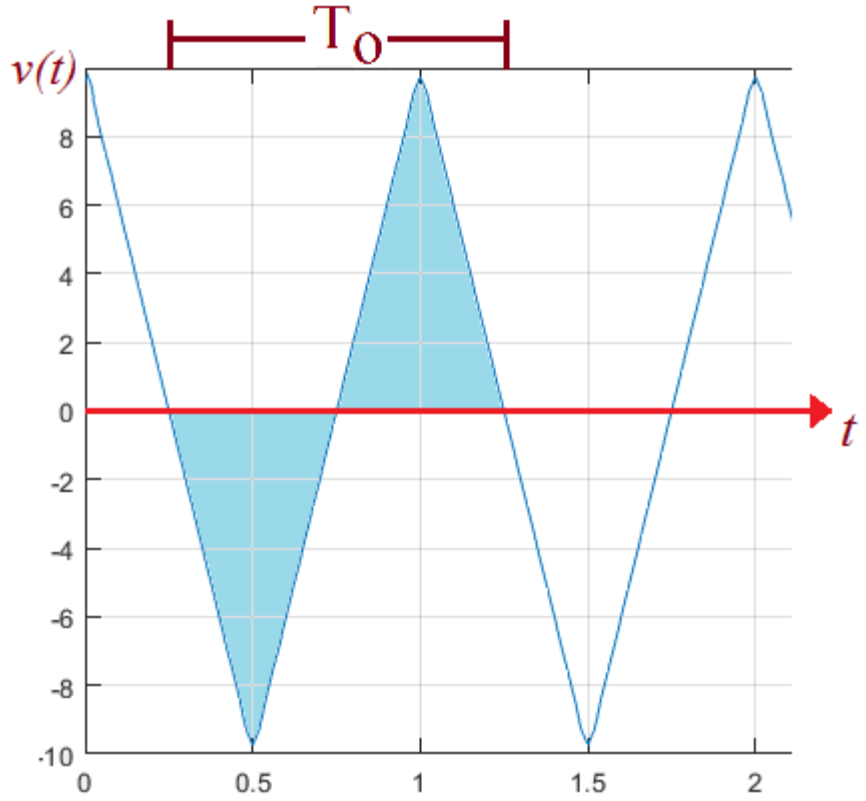



$$V_{prom} = 0$$


v(t)
150
100
50
0
-50
-100
-150
0
0.005
0.01
0.015
0.02
0.025
0.03
0.035
0.04
t


v(t)
150
100
50
0
-50
-100
-150
0
0.005
0.01
0.015
0.02
0.025
0.03
0.035
0.04
t

$$V_{prom} = 0$$



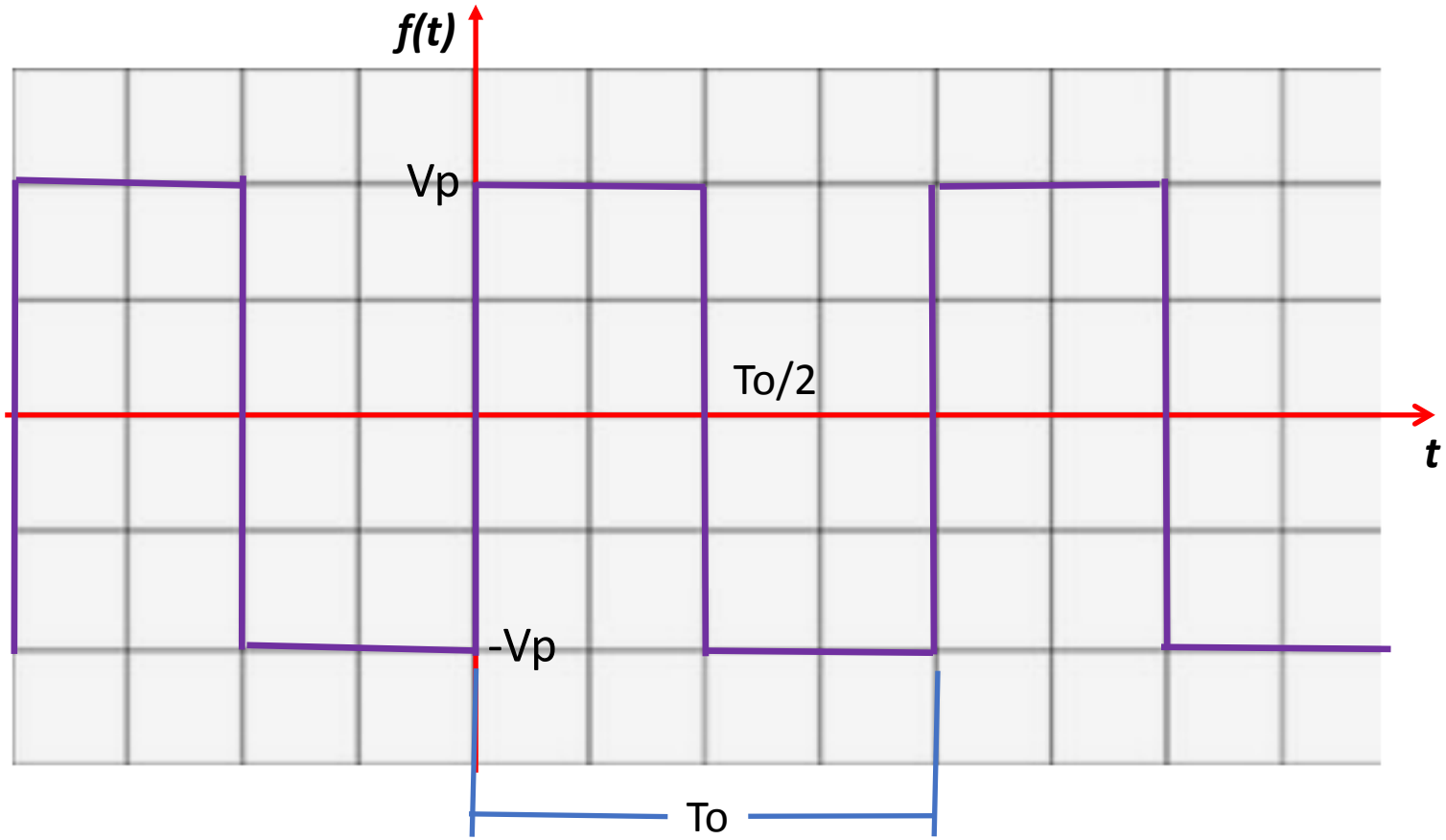

$$V_{prom} = 0$$

$* \quad V_{RMS} \rightarrow Voltaje\ Eficaz$

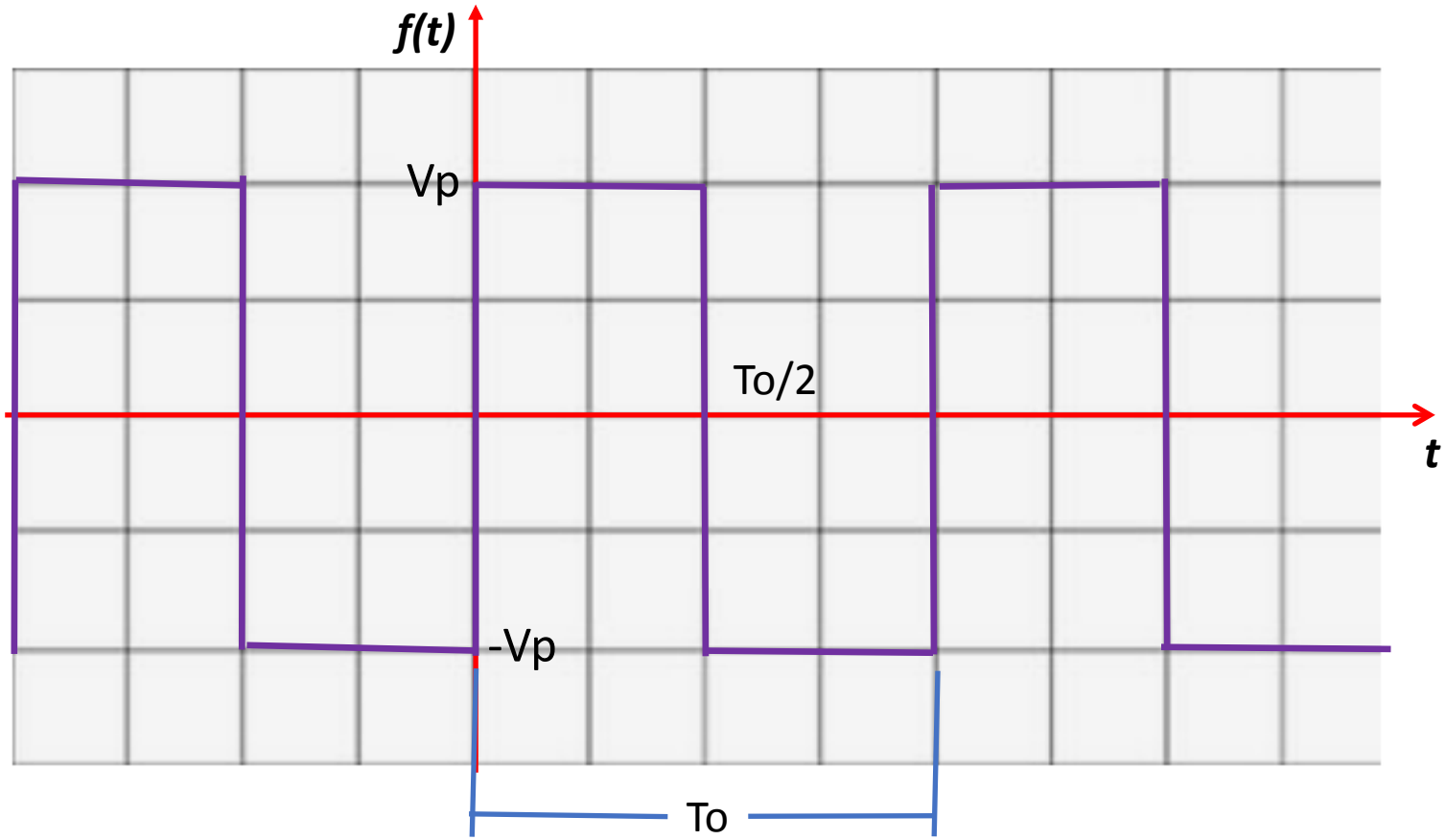
$$V_{RootMeansSquare} = \sqrt[2]{\frac{1}{T_0}\int_{-T_0/2}^{T_0/2} f^2(t)\,dt}$$

$$V_{RMS} = \sqrt[2]{\frac{1}{T_0}\int_{-T_0/2}^{T_0/2} f^2(t)dt}$$

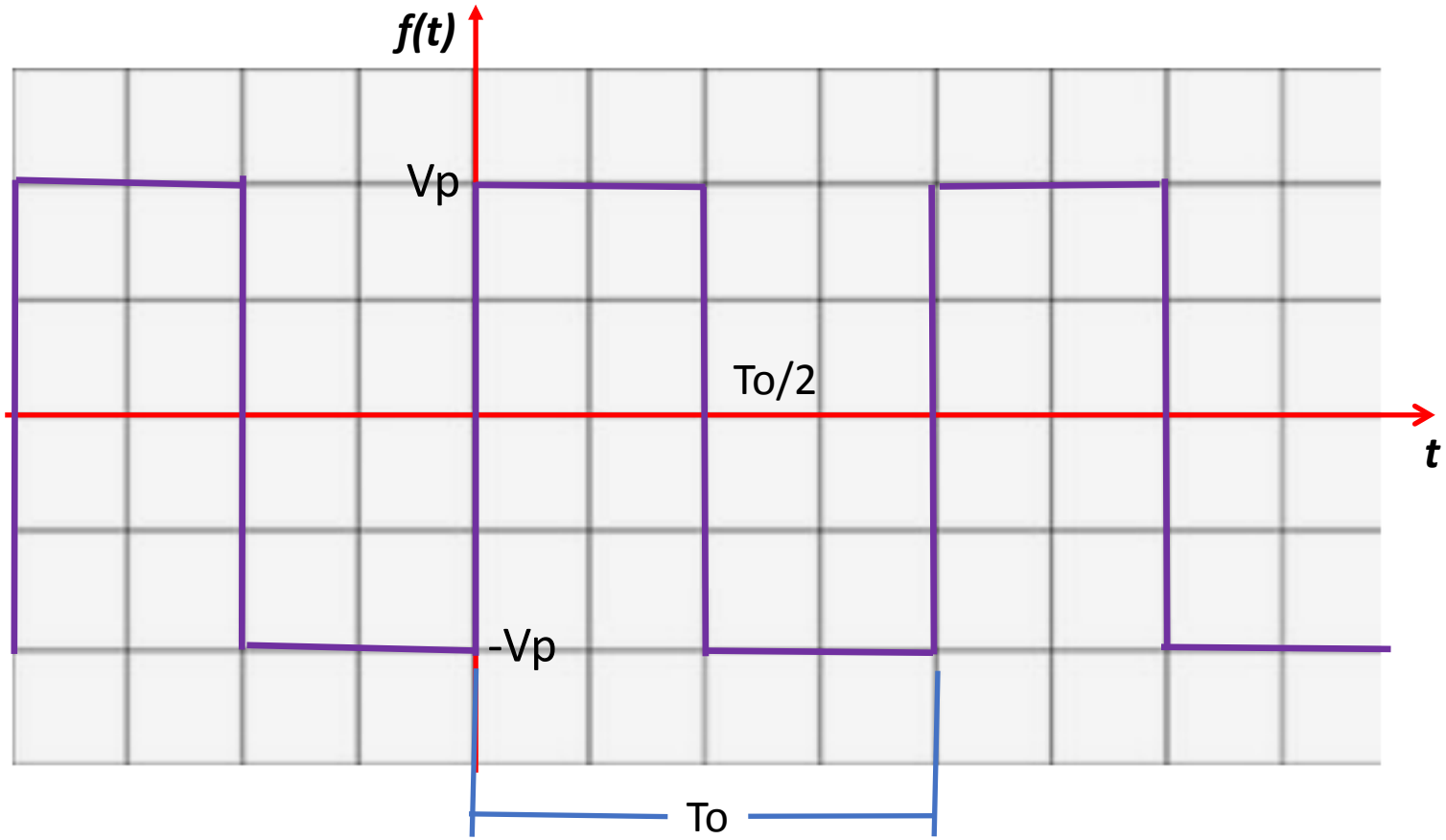
$$V_{RMS} \rightarrow Voltaje\ Eficaz$$



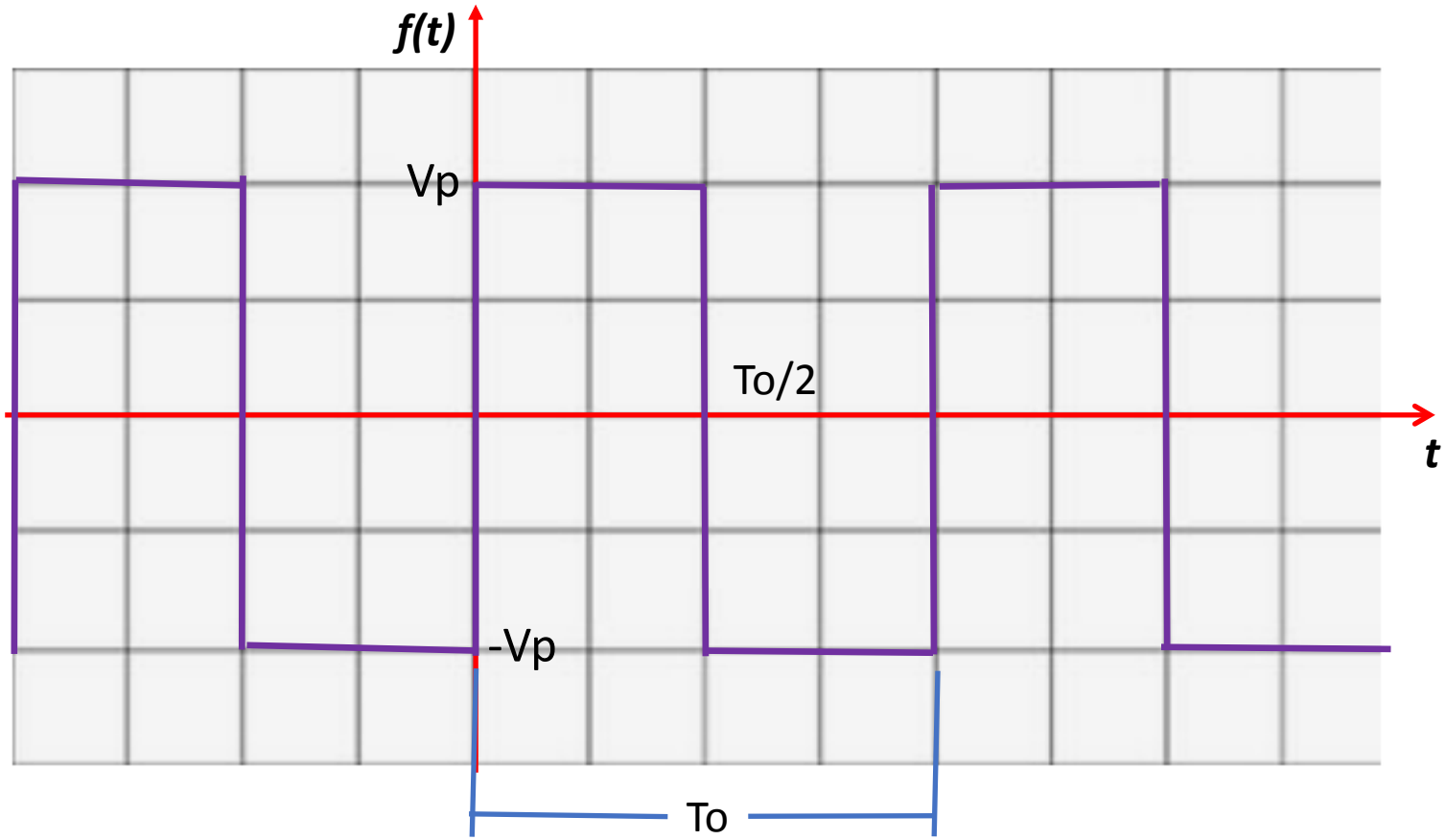

$$V_{RMS} = \sqrt[2]{\frac{1}{T_0}\int_0^{T_0} f^2(t)dt}$$



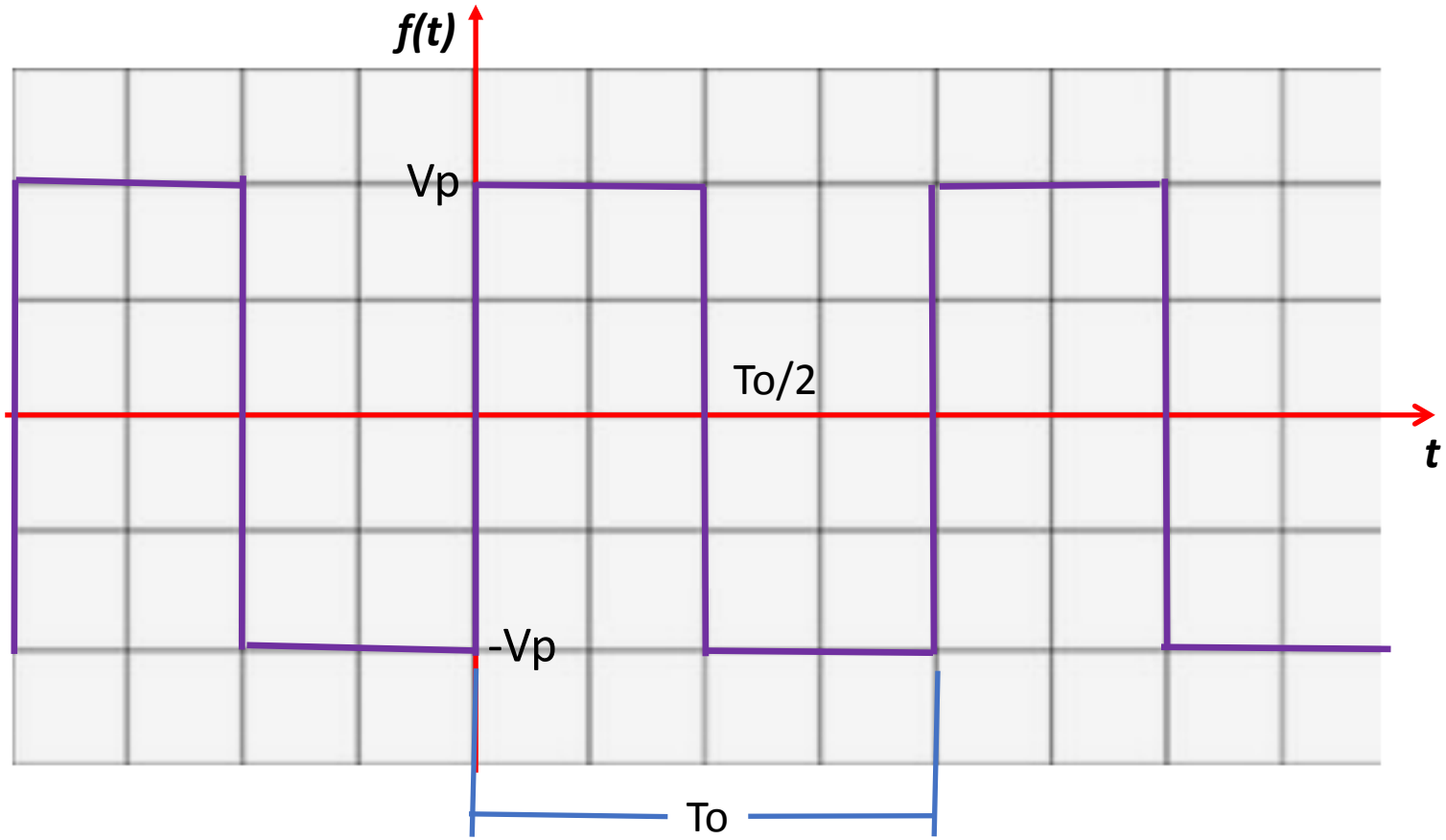

$$V_{RMS} = \sqrt[2]{\frac{1}{T_0}\left[\int_0^{T_0/2} f^2(t)dt + \int_{T_0/2}^{T_0} f^2(t)dt\right]}$$



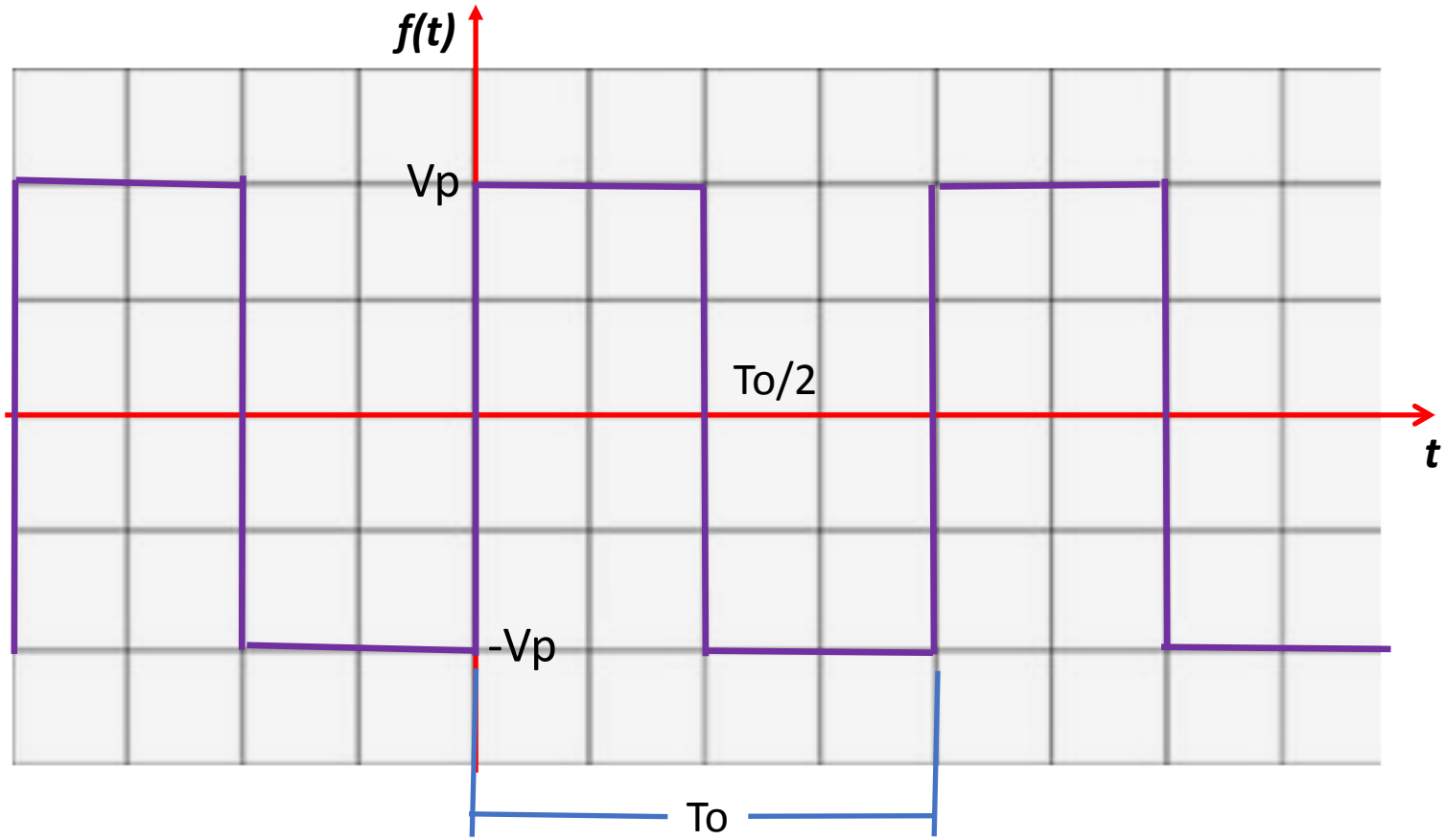

$$V_{RMS} = \sqrt[2]{\frac{1}{T_0}\left[\int_0^{T_0/2} (V_P)^2 \, \mathrm{d}t \; + \int_{T_0/2}^{T_0} (-V_P)^2 \, \mathrm{d}t \right]}$$



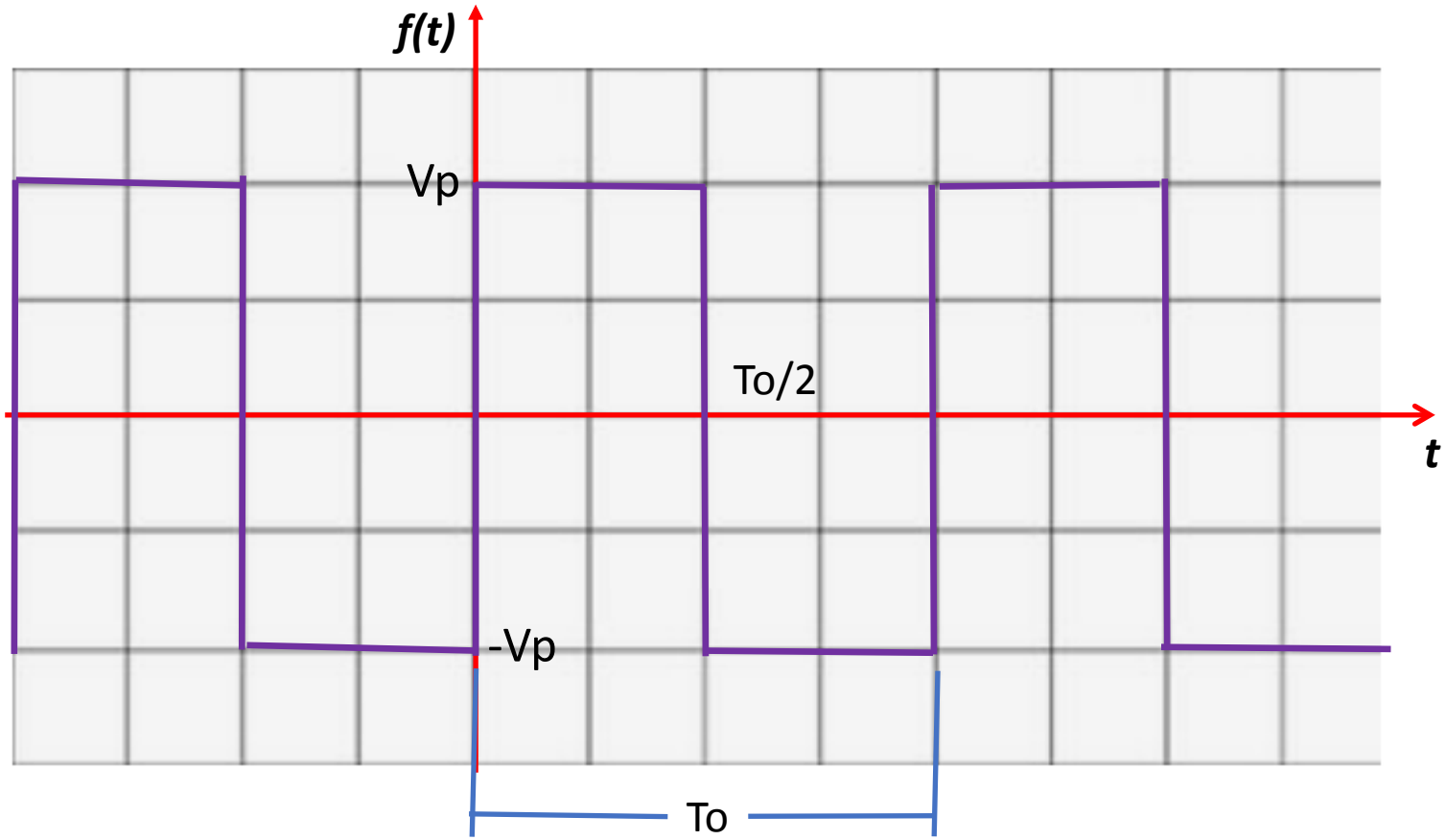

$$V_{RMS} = \sqrt[2]{\frac{1}{T_0}\left[\int_0^{T_0/2} (V_P)^2 \, \mathrm{d}t \; + \int_{T_0/2}^{T_0} (-V_P)^2 \, \mathrm{d}t \right]}$$



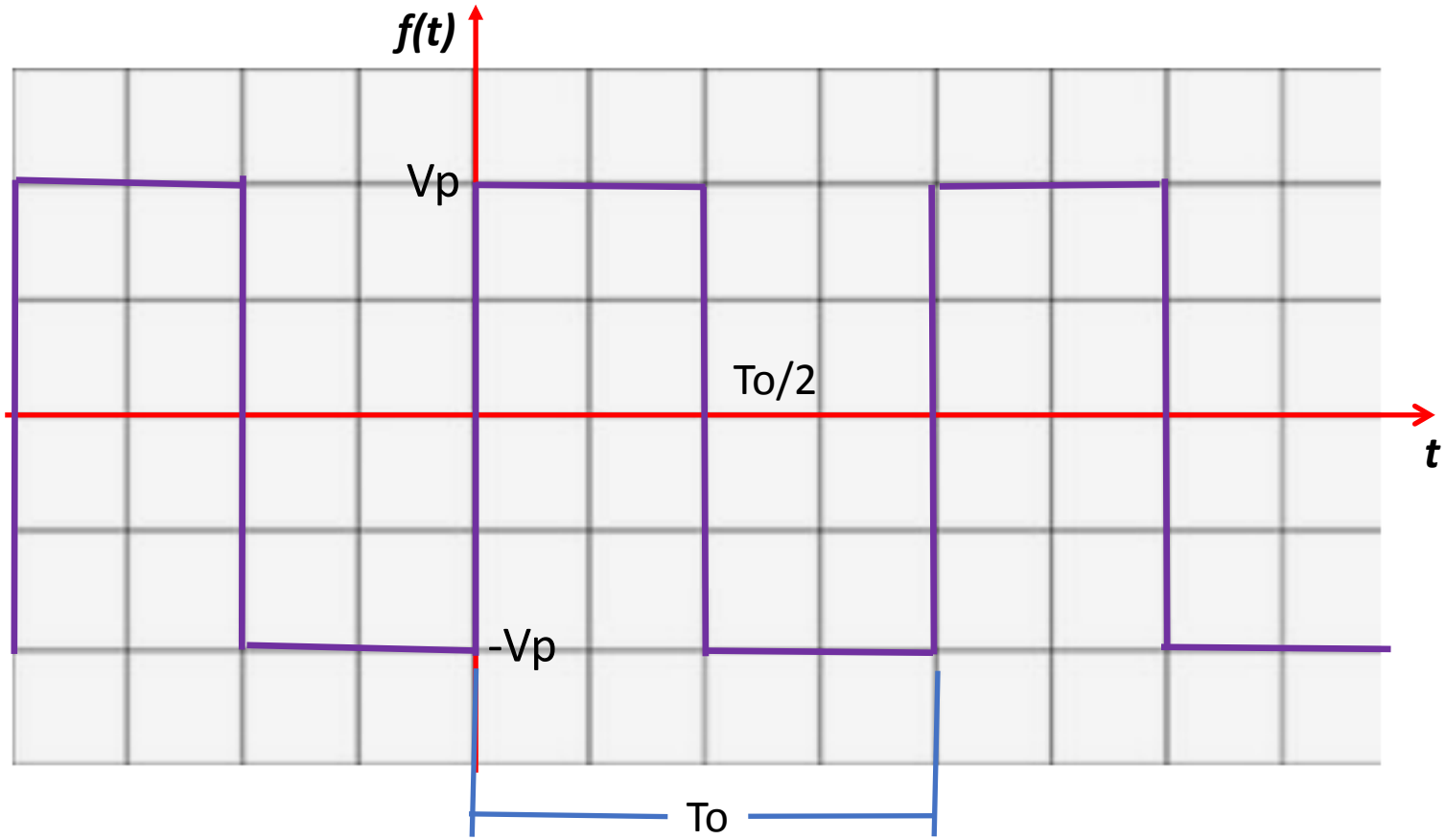

$$V_{RMS} = \sqrt{\frac{1}{T_0}\left[V_P{}^2 \int_0^{T_0/2} \mathrm{d}t + V_P{}^2 \int_{T_0/2}^{T_0} \mathrm{d}t\right]}^2$$



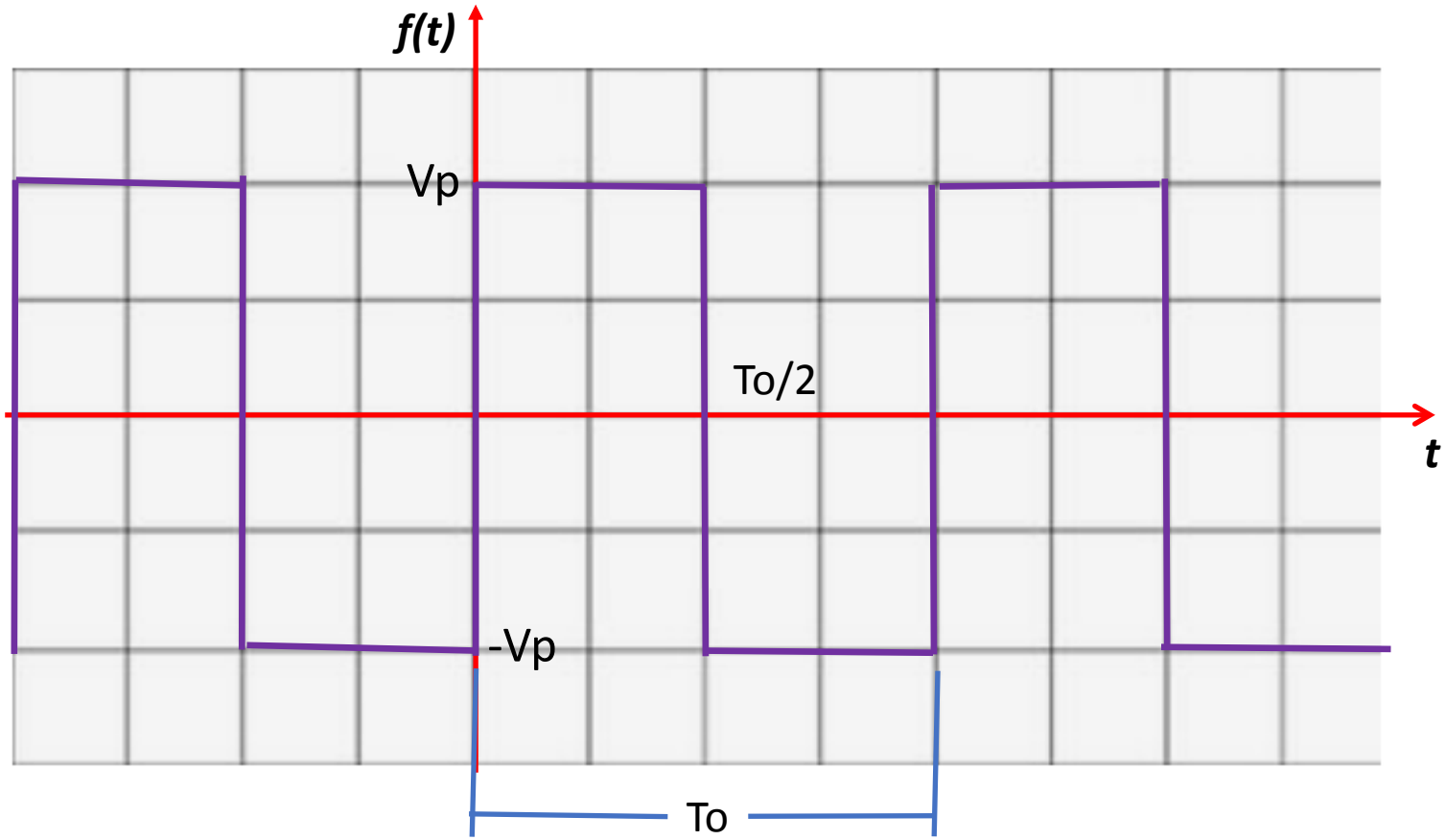

$$V_{RMS} = \sqrt[2]{\frac{1}{T_0}\left[{V_P}^2[t]_0^{T_0/2} + {V_P}^2[t]_{T_0/2}^0\right]}$$



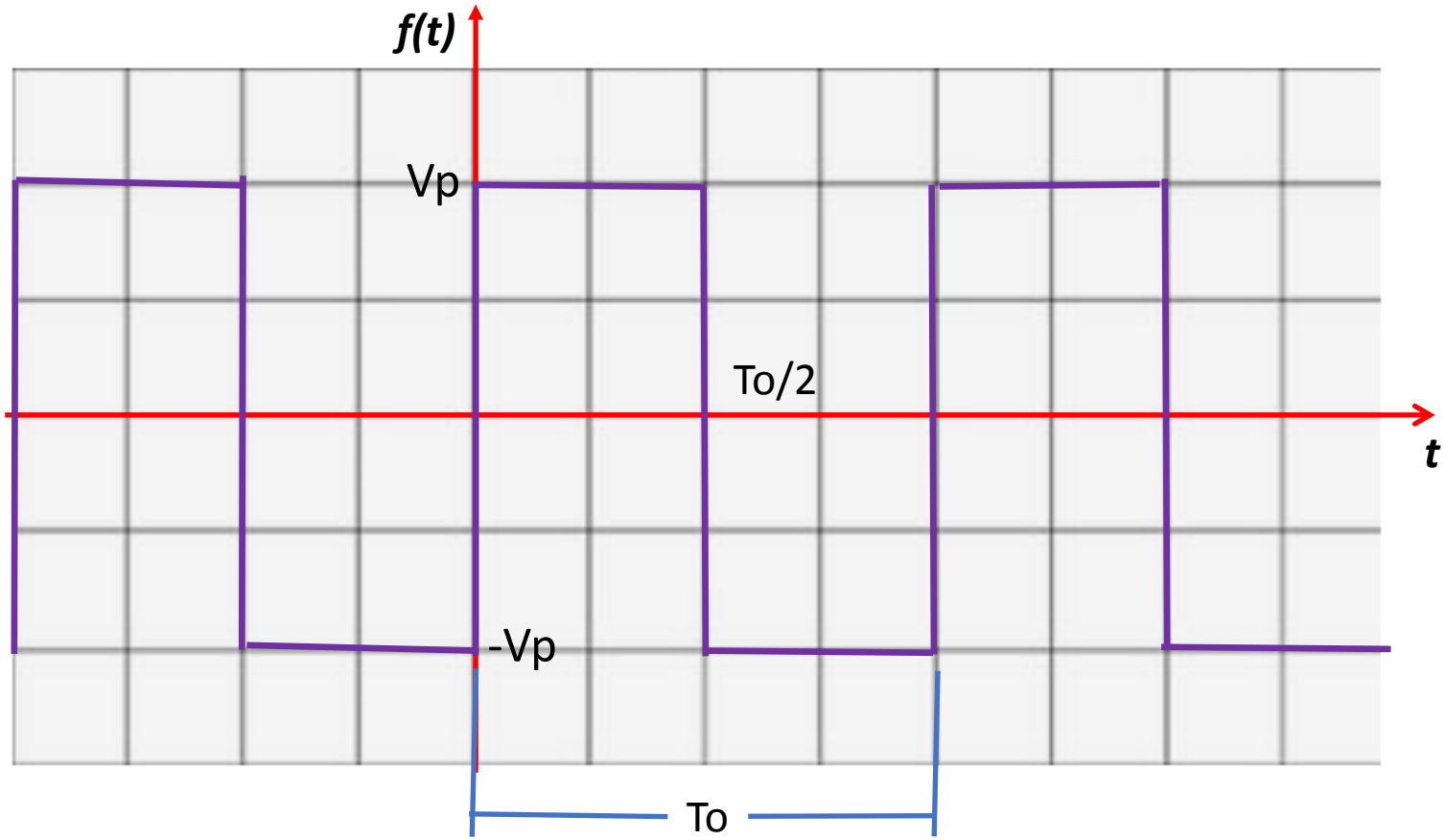

$$V_{RMS} = \sqrt[2]{\frac{1}{T_0}\left[{V_P}^2\left[\frac{T_0}{2}\right] + {V_P}^2\left[\frac{T_0}{2}\right]\right]}$$




$$V_{RMS} = \sqrt[2]{\frac{V_P{}^2 T_0}{T_0}}$$




$$V_{RMS} = \sqrt[2]{V_P{}^2}$$




$$Para\ una\ señal\ cuadrada: \quad V_{RMS} = V_P$$

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$$Para\ una\ señal\ triangular: \quad V_{RMS} = \frac{V_P}{\sqrt{3}}$$

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$$Para\ una\ señal\ senoidal: \quad V_{RMS} = \frac{V_P}{\sqrt{2}}$$

$$V_{RMS} = \sqrt[2]{\frac{1}{T_0}\int_{-T_0/2}^{T_0/2} f^2(t)\,dt}$$