P11 - 2.1 - $v = \dfrac{d}{t}$ Notes

$\boxed{s = \dfrac{d}{t}}$ $\boxed{\vec{v} = \dfrac{\vec{d}}{t}}$ $\boxed{\text{Units!}}$

$\boxed{\begin{array}{c} N \\ \uparrow \quad + \\ \rightarrow E \end{array}}$
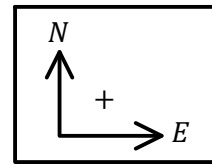
Find the speed travelling 40 m in 5 s?

$s = \dfrac{d}{t}$

$s = \dfrac{40}{5}$

$\boxed{s = 8\dfrac{m}{s}}$

t	d
0	0
1	8
2	16
3	24
4	32
5	40

$t = 5$ → $d = 40$

Find the velocity travelling 40 m in 5 s?

$\vec{v} = \dfrac{\vec{d}}{t}$

$\vec{v} = \dfrac{40}{5}$

$\boxed{\vec{v} = 8\dfrac{m}{s}}$

Obviously!
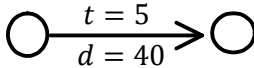
How far will you drive at $25\dfrac{m}{s}$ for 15 s?

$\vec{v} = \dfrac{\vec{d}}{t}$

$25 = \dfrac{\vec{d}}{15}$

$15 \times 25 = \dfrac{\vec{d}}{15} \times 15$

$\boxed{d = 375m}$

Algebra

$\vec{v} = \dfrac{\vec{d}}{t}$

$\vec{d} = vt$

$\vec{d} = 25 \times 15$

$\vec{d} = 375\ m$

$\boxed{\text{Isolate 1st}}$

How long to drive 125 km travelling $25\dfrac{km}{hr}$?

$\vec{v} = \dfrac{\vec{d}}{t}$

$25 = \dfrac{125}{t}$

$t \times 25 = \dfrac{125}{t} \times t$

$25t = 125$

$\dfrac{25t}{25} = \dfrac{125}{25}$

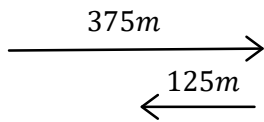$\boxed{t = 5\ hr}$

$\vec{v} = \dfrac{\vec{d}}{t}$

$t = \dfrac{d}{v}$

$t = \dfrac{125}{25}$

$\boxed{t = 5\ hr}$

Walk 375 m E and then 125 m W in 25 s. Find d, $\vec{d}, s, and\ v$.

← 375m →
← 125m

$d = 375 + 125$

$\boxed{d = 500m}$

$s = \dfrac{d}{t}$

$s = \dfrac{500}{25}$

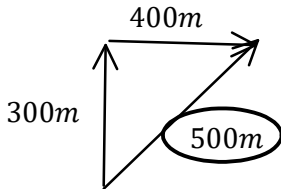$\boxed{s = 20\dfrac{m}{s}}$

$\vec{d} = 375 - 125$

$\boxed{d = 250m}$

$v = \dfrac{\vec{d}}{t}$

$v = \dfrac{250}{25}$

$\boxed{v = 10\dfrac{m}{s}}$

Walk 300 m N and then 400 m E in 25 seconds. Find d, $\vec{d}, s, and\ v$.

400m

300m — 500m

$d = 400 + 300$

$\boxed{d = 700m}$

$s = \dfrac{d}{t}$

$s = \dfrac{700}{25}$

$\boxed{s = 28\dfrac{m}{s}}$

$c = \sqrt{a^2 + b^2}$

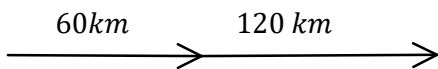$c = \sqrt{300^2 + 400^2}$

$\boxed{c = 500}$

$\boxed{\vec{d} = 500\ m}$

$v = \dfrac{\vec{d}}{t}$

$v = \dfrac{500}{25}$

$\boxed{v = 20\dfrac{m}{s}}$

Drive 2hrs @ $30\dfrac{km}{h}$ + 3hrs @ $40\dfrac{km}{h}$

60km → 120 km →

$\boxed{v^*_{av} = \dfrac{d_{total}}{t_{total}}}$

$v = \dfrac{\vec{d}}{t}$

$\vec{d} = vt$

$\vec{d} = 30 \times 2$

$\boxed{d = 60}$

$v = \dfrac{\vec{d}}{t}$

$\vec{d} = vt$

$\vec{d} = 40 \times 3$

$\boxed{d = 120}$

$v_{av} = \dfrac{d_{total}}{t_{total}}$

$v_{av} = \dfrac{180}{5}$

$v_{av} = 36\dfrac{km}{h}$

$d_{total} = 60 + 120$

$\boxed{=180km}$

$t_{total} = 2 + 3$

$\boxed{= 5\ hrs}$

$\boxed{\begin{array}{c} v^*_{av} = \dfrac{v_f + v_i}{2} \\[4pt] v^*_{av} = \dfrac{40 + 30}{2} \\[4pt] v^*_{av} \neq 35 \\[6pt] \text{Cannot use formula} \\ a \neq constant \end{array}}$