02-2

2022年6月11日 星期六 23:26

1 (1) $\Delta x = 7 - 3 = \boxed{4\,\mathrm{m}}$

(2) $v = 4/8 = \boxed{0.5}\,\mathrm{m/s}$

(3) $5 = x_0 + v_0 t + \frac{1}{2}at^2$

$= 3 + 0.5t$

$2 = 0.5t$

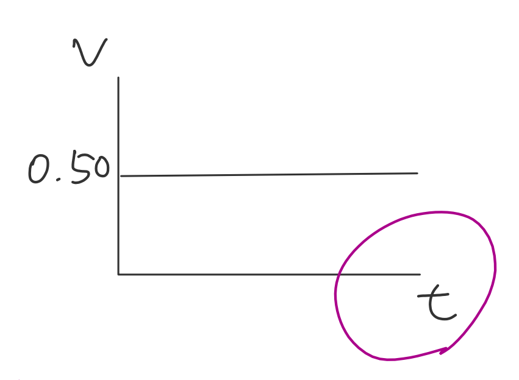
$t = \boxed{4\,\mathrm{s}}$

2 (1) $v = \Delta x/\Delta t$

$= (6.0-2.0)/8.0$

$= 0.\boxed{50}\,\mathrm{m/s}$

(2)



(3) $x = 0.50 \cdot 15 + 0$

$= 7.5\,\mathrm{m/s}$

(3) $x = x_0 + v_0 t + \frac{1}{2}at^2$

$= 2 + 0.50 \cdot 15 + 0 = \boxed{9.5}\,\mathrm{m/s}$

3 $v = 28/8.0 = 3.5\,\mathrm{m/s}$

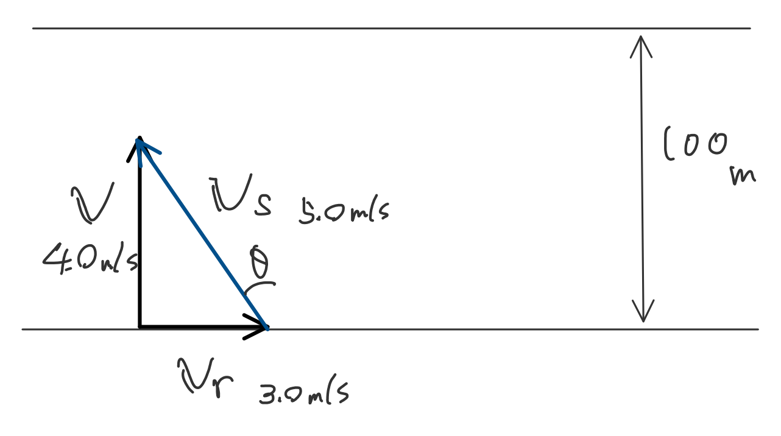
$v = v_p + v_w$

$3.5 = 6.0 + v_w$

$v_w = -2.5$

$|v_w| = \boxed{2.5}\,\mathrm{m/s}$

4



$v = v_r + v_s$

$v_s = v - v_r$

∴ 川岸に垂直な向きから

$\tan\theta = 0.75$ を満たす θ だけ

川上の$\boxed{\text{向き}}$

$v = \Delta x/\Delta t$

$\Leftrightarrow \Delta t = \Delta x / v$

$= 100\,\mathrm{m} / 4.0\,\mathrm{m/s}$

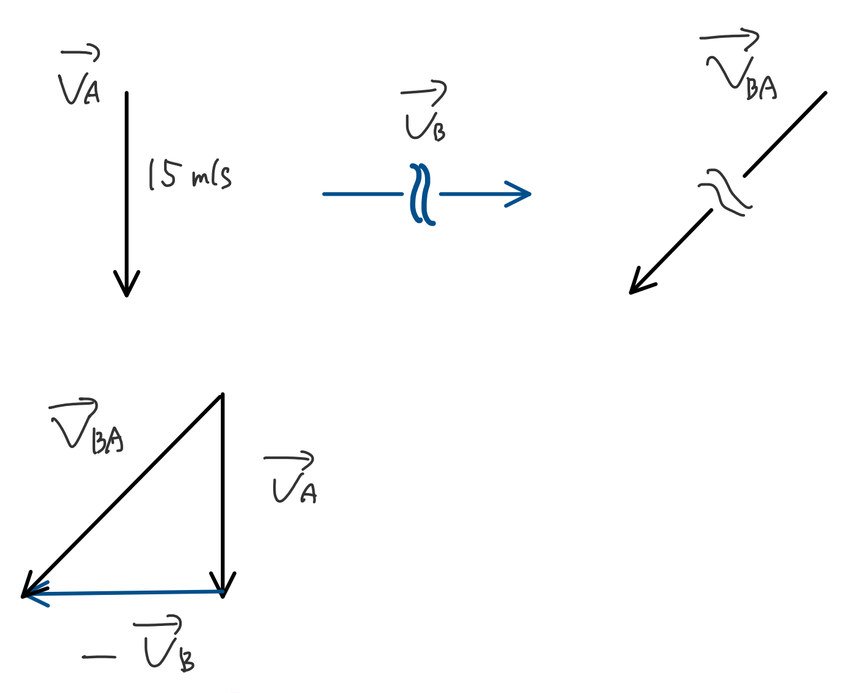
$= \boxed{25\,\mathrm{s}}$

5 $v_{AB} = v_B - v_A = 80 - 60 = 20\,\mathrm{km/h}$ (E)

$v_{BA} = v_A - v_B = 60 - 80 = -20\,\mathrm{km/h}$

$= 20\,\mathrm{km/h}$ (W)

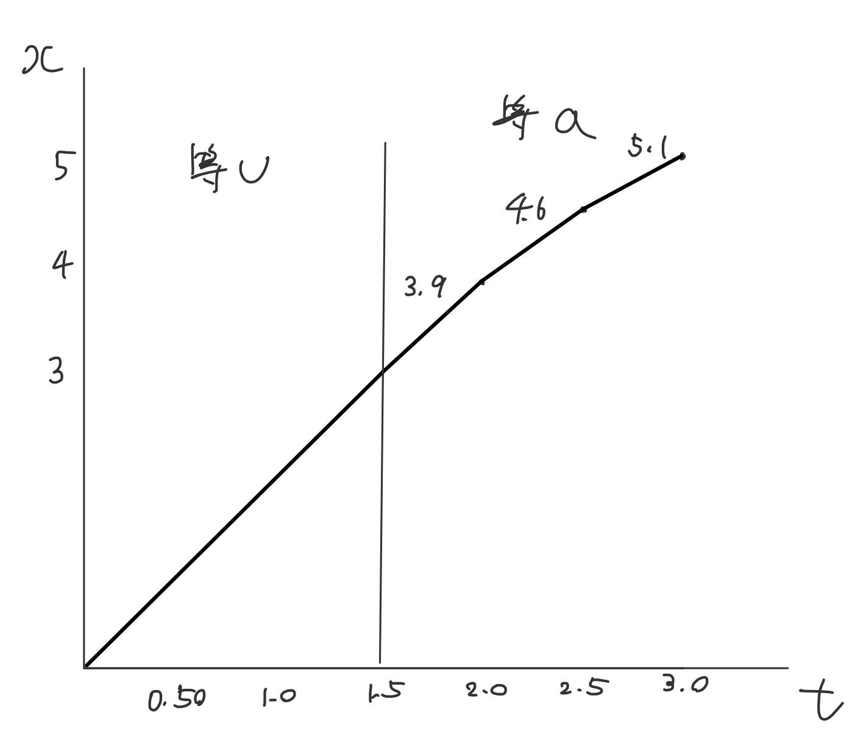
6 $\vec{v}_{BA} = \vec{v}_A - \vec{v}_B$



$|\vec{B}| = \boxed{15\,\mathrm{m/s}}$

$|\vec{v}_{BA}| = 15\sqrt{2} = 21.2\cdots \fallingdotseq \boxed{21}\,\mathrm{m/s}$

7



(1) $v = \Delta x/\Delta t = 3/1.5 = 2.0\,\mathrm{m/s}$ (+)

(2) $\bar{a} = \Delta v/\Delta t$

$1.5 \sim 2.0$: $\bar{v} = (3.9 - 3.0)/(0.5)$

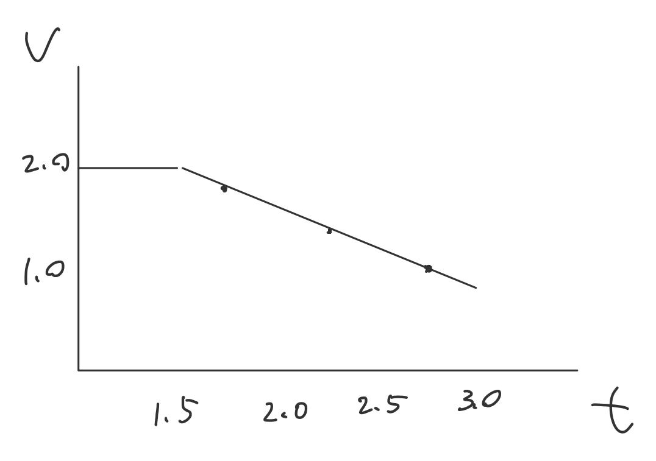
$= 0.9/0.5 = 1.8\,\mathrm{m/s}$

$2.0 \sim 2.5$: $\bar{v} = (4.6 - 3.9)/(0.5)$

$= 0.7/0.5 = 1.4\,\mathrm{m/s}$

$2.5 \sim 3.0$: $\bar{v} = (5.1 - 4.6)/(0.5)$

$= 0.5/0.5 = 1.0\,\mathrm{m/s}$



$\Delta v = (1.0 - 1.8)/(1.0)$

$= -0.80\,\mathrm{m/s}$

$\bar{a} = -0.80\,\mathrm{m/s} / 1.0\,\mathrm{s}$

$= -0.80\,\mathrm{m/s^2}$

$= 0.80\,\mathrm{m/s^2}\ (-)$

(3) $v = v_0 + at$

$= 2.0 - 0.80 \cdot (2.0 - 1.5)$

$= 1.6\,\mathrm{m/s}\ (+)$

8 (1) $72\,\mathrm{km/h} = 72 \cdot 10^3 / 3600 = 20\,\mathrm{m/s}$

$a = (0 - 20)_{\mathrm{m/s}} / \Delta t_{\mathrm{s}} = -20/\Delta t$

$100 = 20\Delta t + \frac{1}{2}a\Delta t^2$

$= 20\Delta t + \frac{1}{2}\left(-\frac{20}{\cancel{\Delta t}}\right)\Delta t^{\cancel{2}}$

$= 10\Delta t$

$\Delta t = \boxed{10\,\mathrm{s}}$

$a = -20/10 = -2.0\,\mathrm{m/s^2}$

$= 2.0\,\mathrm{m/s^2}$ (L) (初速度と逆向き)

(2) $x = 20 \cdot 5.0 + \frac{1}{2}(-2.0) \cdot 5.0^2$

$= 100 - 25 = \boxed{75\,\mathrm{m}}$

9 (1) $v = v_0 + at$

$-8.0 = 2.0 + a \cdot 4.0$

$4.0a = -10$

$a = -2.5\,\mathrm{m/s^2} = 2.5\,\mathrm{m/s^2}$ (L)

(2) $0 = 2.0 - 2.5t$

$t = 20/25 = 4/5 = 0.80\,\mathrm{s}$

$x = 2.0 \cdot 0.80 + \frac{1}{2} \cdot (-2.5) \cdot 0.80^2$

$= 0.80\,\mathrm{m}$ (初位置から右へ)

(3) $x = 2.0 \cdot 4.0 + \frac{1}{2} \cdot (-2.5) \cdot 4.0^2$

$= -12\,\mathrm{m}$

= 初位置から左へ 12m

(4) $-0.45 = 2.0t + \frac{1}{2}(-2.5)t^2$

$-9 = 4t - 2.5t^2$

$5t^2 - 4t - 9 = 0$

$t = \frac{4 \pm \sqrt{16 + 180}}{10}$

$t\ (t > 0) = 1.8\,\mathrm{s}$

$v = v_0 + at$

$= 2.0 - 2.5 \cdot 1.8$

$= -2.5$

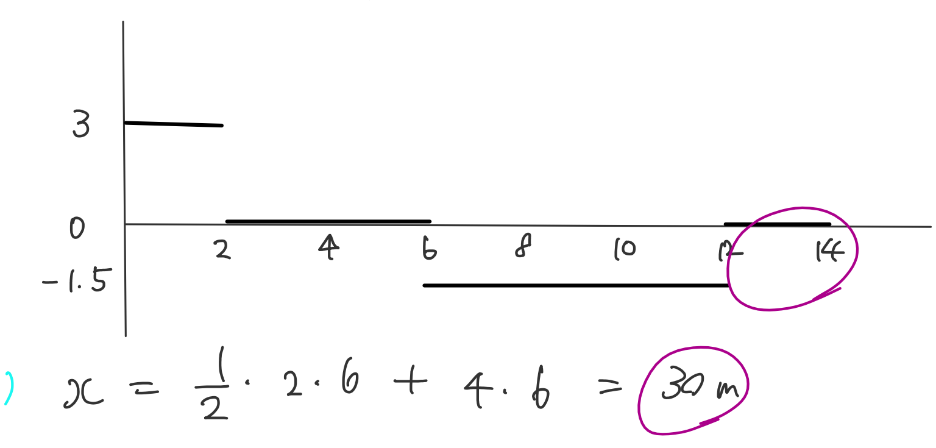
$|v| = \boxed{2.5}\,\mathrm{m}$

10 (1) $0 \sim 2$: $a = 6/2 = 3\,\mathrm{m/s^2}$

$2 \sim 6$: $a = 0\,\mathrm{m/s}$

$6 \sim 12$: $a = (-3 - 6)/6 = -1.5\,\mathrm{m/s^2}$

$12 \sim 14$: $a = 0\,\mathrm{m/s}$



(2) $x = \frac{1}{2} \cdot 2 \cdot 6 + 4 \cdot 6 = \boxed{30\,\mathrm{m}}$

(3) $t = \boxed{10\,\mathrm{s}}$

$x = \frac{1}{2} \cdot 2 \cdot 6 + 4 \cdot 6 + \frac{1}{2} \cdot 4 \cdot 6$

$= 6 + 24 + 12 = \boxed{42\,\mathrm{m}}$

(4) $42 + \frac{1}{2} \cdot 2 \cdot (-3) + 2(-3)$

$= 6 + 24 + 12 - 3 - 6$

$= 42 - 9 = \boxed{33}\,\mathrm{m}$