

Vectors Practice: Eq. of Lines

$$1) 2 + s = 3 - t \rightarrow s = 1 - t$$

$$5 + 2s = -3 + 3t$$

$$5 + 2(1 - t) = -3 + 3t$$

$$5 + 2 - 2t = -3 + 3t$$

$$10 = 5t$$

$$2 = t$$

$$T = \begin{pmatrix} 3 \\ -3 \\ 8 \end{pmatrix} + 2 \begin{pmatrix} -1 \\ 3 \\ -4 \end{pmatrix} = (1, 3, 0)$$

$$2) a. \sqrt{(3k)^2 + (4k)^2 + (0k)^2} = 18$$

$$\sqrt{9k^2 + 16k^2} = 18$$

$$\sqrt{25k^2} = 18$$

$$5k = 18$$

$$k = \frac{18}{5}$$

$$\frac{18}{5} \begin{pmatrix} 3 \\ 4 \\ 0 \end{pmatrix} = \begin{pmatrix} 10.8 \\ 14.4 \\ 0 \end{pmatrix}$$

$$b. i) \text{ let } t=0, \begin{pmatrix} 49 \\ 32 \\ 0 \end{pmatrix} + \begin{pmatrix} 0 \\ 0 \\ 0 \end{pmatrix} = (49, 32, 0)$$

$$ii) \sqrt{(-48)^2 + (-24)^2 + 6^2} = 54 \text{ km/h}$$

$$c. i) 0 + 10.8t = 49 - 48s$$

$$(0 + 14.4t = 32 - 24s) \cdot (-2)$$

$$-18t = -15$$

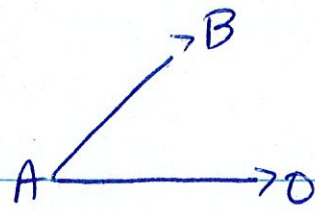
$$t = \frac{15}{18} = .83 \text{ hr or 50 minutes}$$

Use any method to solve -
I chose elimination.

$$ii) R = \begin{pmatrix} 0 \\ 0 \\ 5 \end{pmatrix} + \frac{15}{18} \begin{pmatrix} 10.8 \\ 14.4 \\ 0 \end{pmatrix} = (9, 12, 5)$$

Answers for Review Set 12C are found in
the online textbook

$$3. a. i) \vec{AB} = \begin{pmatrix} -3-1 \\ 4-2 \\ 2-3 \end{pmatrix} = \begin{pmatrix} -4 \\ 2 \\ -1 \end{pmatrix}$$



ii) Need to use \vec{AB} & \vec{AO}

$$\vec{AO} = -\vec{OA} = \begin{pmatrix} -1 \\ 2 \\ -3 \end{pmatrix}$$

$$\cos \theta = \frac{-4(-1) + 2(2) - 1(-3)}{\sqrt{53} \cdot \sqrt{14}}$$

$$\theta = 45.8^\circ$$

b) Let s be any integer value. I picked $s=0, 1$.

When $s=0$, $(-3, 4, 2)$ when $s=1$, $(-7, 10, 1)$

$$c) i) L_2 = \begin{pmatrix} 1 \\ -2 \\ 3 \end{pmatrix} + t \begin{pmatrix} -3 \\ 4 \\ 2 \end{pmatrix}$$

ii) There is a typo. Use $C = (k, -k, 5)$. Then

~~the~~ $t=1$ so that

$$C = (-2, 2, 5)$$

$$d) 0 - p = 5$$

$$p = -5$$

$$4. a) \text{ Let } p=2; \begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} 0 \\ 12 \end{pmatrix} + 2 \begin{pmatrix} -4 \\ 1 \end{pmatrix} \rightarrow (-8, 14)$$

$$b) i) \begin{cases} 0 - 4p = 14 + 2q \\ 12 + p = 0 + 5q \end{cases} \quad p = \frac{-47}{11} \quad \& \quad q = \frac{17}{11}$$

$$ii) P = \begin{pmatrix} 14 \\ 0 \end{pmatrix} + \frac{17}{11} \begin{pmatrix} 2 \\ 5 \end{pmatrix} = \left(\frac{188}{11}, \frac{85}{11} \right)$$