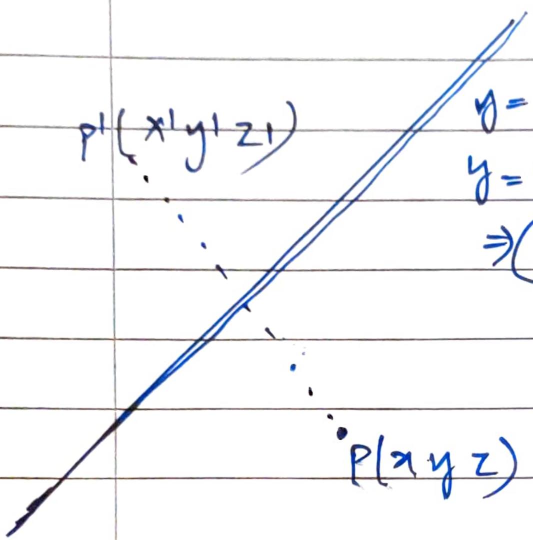
1. TO find Reflection of Δ^{le} ABC I would find Reflection to each of the given points.

Given points A[2,5,1] B[4,7,1] C[2,7,1]
line equation, $y = \frac{1}{2}x+3$.



$y = \frac{1}{2}x+3$
$y = mx+c$
$\Rightarrow$ slope = 1/2

① Basic Intuition is I will convert the given $y = \frac{1}{2}x+3$ line such a way that it merges with x-axis.

② then I will apply reflection wrt to x-axis.

③ To convert $y = \frac{1}{2}x+3$ such a way that it merges with x-axis we need $\boxed{\text{Rotation \& translation.}}$

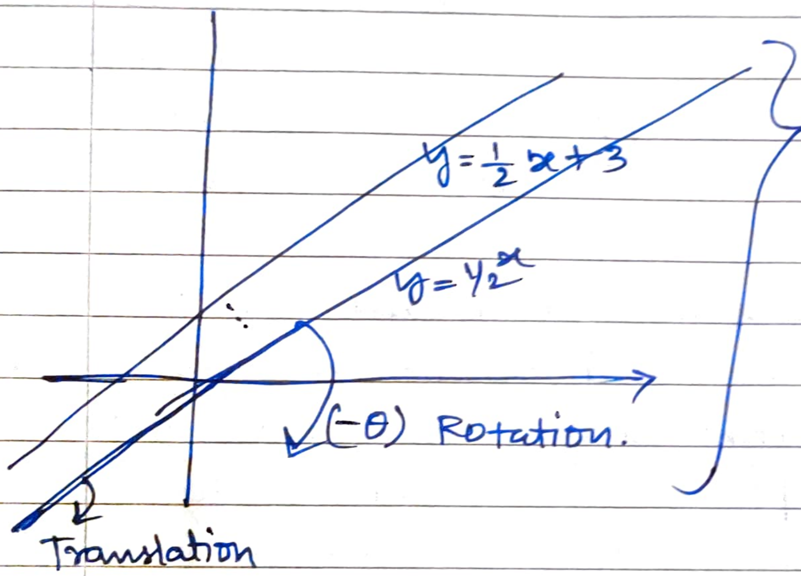
④ since our given point also moves wrt to the line (assuming) $\boxed{\text{here we basically apply translation and rotation operation on our given point}}$

⑤ then we reflect the point in such a way we are $\boxed{\text{reflecting wrt to x-axis.}}$

⑥ finally $\boxed{\text{we undo the steps ④ \& ③}}$ by doing inverse rotation & translation.

⑦ so the operations go in order given as follows: (using the given function)

1. Translation $(-3, P[x, y, z], P[x', y', z'])$
2. Rotation $(-\theta, P[x, y, z], P[x', y', z'])$ $\tan\theta = 1/2$
3. Reflection $(P[x, y, z], P[x', y', z'])$
4. Rotation $(\theta, P[x, y, z], P[x', y', z'])$
5. Translation $(3, P[x, y, z]\ P[x', y', z'])$



(Idea behind merging with x-axis)

$A\,[2\ 5\ 1]$

① $(2, 5+3, 1) = (2, 8, 1)$

② $x' = x\cos\theta + y\sin\theta$

$= 2\left(\frac{2}{\sqrt5}\right) + 8\left(\frac{1}{\sqrt5}\right) = \frac{12}{\sqrt5}$

$y' = x\sin(-\theta) + y\cos\theta$

$= y\cos\theta - x\sin\theta$

$= 8\left(\frac{2}{\sqrt5}\right) - 2\left(\frac{1}{\sqrt5}\right) = 14/\sqrt5$

$z' = z = 1$

$\left(\frac{12}{\sqrt5}\ \frac{14}{\sqrt5}, 1\right)$

③ $\left(\frac{12}{\sqrt5}, \frac{-14}{\sqrt5}, -1\right)$

④ $x' = x\cos\theta - y\sin\theta$

$= \left(\frac{12}{\sqrt5}\right)\left(\frac{2}{\sqrt5}\right) - \left(\frac{-14}{\sqrt5}\right)\left(\frac{1}{\sqrt5}\right)$

$= \frac{24+14}{5} = \frac{38}{5}$

$y' = x\sin\theta + y\cos\theta = \left(\frac{12}{\sqrt5}\right)\left(\frac{1}{\sqrt5}\right) + \left(\frac{-14}{\sqrt5}\right)\left(\frac{2}{\sqrt5}\right)$

$= \frac{12-28}{5} = \frac{-16}{5}$

$z' = z = -1$

⑤ $\left(\frac{38}{5}, \frac{-16}{5} - 3, -1\right) \hookrightarrow \left(\frac{38}{5}, \frac{-31}{5}, -1\right)$

B [4 7 1]

① (4 10 1)

②

$x' = x\cos\theta + y\sin\theta$

$= (4)\left(\frac{2}{\sqrt5}\right) + 10\left(\frac{1}{\sqrt5}\right) = \frac{18}{\sqrt5}$

$y' = y\cos\theta - x\sin\theta$

$= 10\left(\frac{2}{\sqrt5}\right) - 4\left(\frac{1}{\sqrt5}\right) = 16/\sqrt5$

$z' = z = 1$

$\left(\frac{18}{\sqrt5}, \frac{16}{\sqrt5}, 1\right)$

③ $\left(\frac{18}{\sqrt5}, \frac{-16}{\sqrt5}, -1\right)$

④ $x' = x\cos\theta - y\sin\theta$

$= \frac{18}{\sqrt5}\left(\frac{2}{\sqrt5}\right) - \left(\frac{-16}{\sqrt5}\right)\left(\frac{1}{\sqrt5}\right) = \frac{52}{5}$

$y' = x\sin\theta + y\cos\theta = \left(\frac{18}{\sqrt5}\right)\left(\frac{1}{\sqrt5}\right) + \left(\frac{-16}{\sqrt5}\right)\left(\frac{2}{\sqrt5}\right)$

$= \frac{-14}{5}$

$\begin{array}{r} \cancel{3}2 \\ -18 \\ \hline 14 \end{array}$

$z' = z = -1$

⑤ $\left(\frac{52}{5}, \frac{-14}{5} - 3, -1\right) = \boxed{B\left(\frac{52}{5}, \frac{-29}{5}, -1\right)}$

$C\,[2, 7, 1]$

① $(2, 7+3, 1) = (2, 10, 1)$

② $x' = 2\left(\frac{2}{\sqrt{5}}\right) + \frac{10}{\sqrt{5}} = 14/\sqrt{5}$

$y' = \cancel{x} \; y\cos\theta - x\sin\theta$

$= 10\left(\frac{2}{\sqrt{5}}\right) - 2\left(\frac{1}{\sqrt{5}}\right) = 18/\sqrt{5}$

$\left(\frac{14}{\sqrt{5}}, \frac{18}{\sqrt{5}}, 1\right)$

$z' = z = 1$

③ $\left(\frac{14}{\sqrt{5}}, \frac{-18}{\sqrt{5}}, -1\right)$

$28 + 18 = 46$

④ $x' = x\cos\theta - y\sin\theta$

$= \left(\frac{14}{\sqrt{5}}\right)\left(\frac{2}{\sqrt{5}}\right) - \left(\frac{-18}{\sqrt{5}}\right)\left(\frac{1}{\sqrt{5}}\right) = \frac{46}{5}$

$-36 - 14 = 22$

$y' = x\sin\theta + y\cos\theta$

$= \frac{14}{\sqrt{5}}\left(\frac{1}{\sqrt{5}}\right) + \left(\frac{-18}{\sqrt{5}}\right)\left(\frac{2}{\sqrt{5}}\right) = \frac{-22}{5}$

$z' = z = -1$

⑤ $\left(\frac{46}{5}, \frac{-22}{5} - 3, -1\right) \rightarrow \boxed{C'\left(\frac{46}{5}, \frac{-37}{5}, -1\right)}$