Find the line through $P(-2, 7)$ and is perpendicular to $l_1: 5x - 4y = 6$.

Soln

$$y - y_1 = m(x - x_1)$$
$$y - 7 = m(x + 2)$$

$m \cdot m_1 = -1$

$5x - 4y = 6$

$-4y = -5x + 6$

$y = \frac{5}{4}x - \frac{3}{2}$

m_1

$m_1 = \frac{5}{4}$

$m\left(\frac{5}{4}\right) = -1$

$m = \frac{-4}{5}$

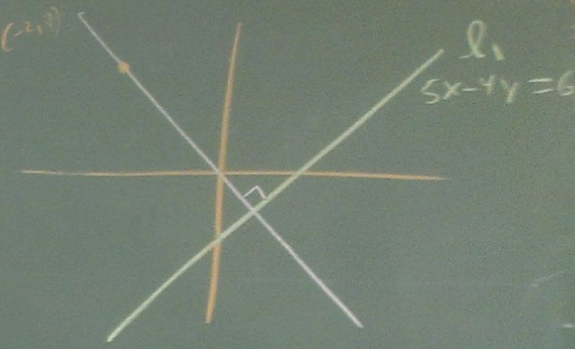
$$y - 7 = \frac{-4}{5}(x + 2)$$

$y - 7 = \frac{-4}{5}(x + 2)$

$5y - 35 = -4(x + 2)$

$5y - 35 = -4x - 8$

$4x + 5y = 27$



Perpendicular

FACT if ℓ_1 is perdicular to ℓ_2
and m_1 is slope of ℓ_1
m_2 is slope of ℓ_2

Then

ℓ_1 and ℓ_2 are perpendicular
if and only if

$$m_1 \cdot m_2 = -1$$

□

EX1 are $l_1: 2x - 3y = 5$ and $l_2: -3x + 2y = 8$ perpendicular?

SOLN

compute m_1, m_2.

If $m_1 \cdot m_2 = -1$, Perpendicular

otherwise not