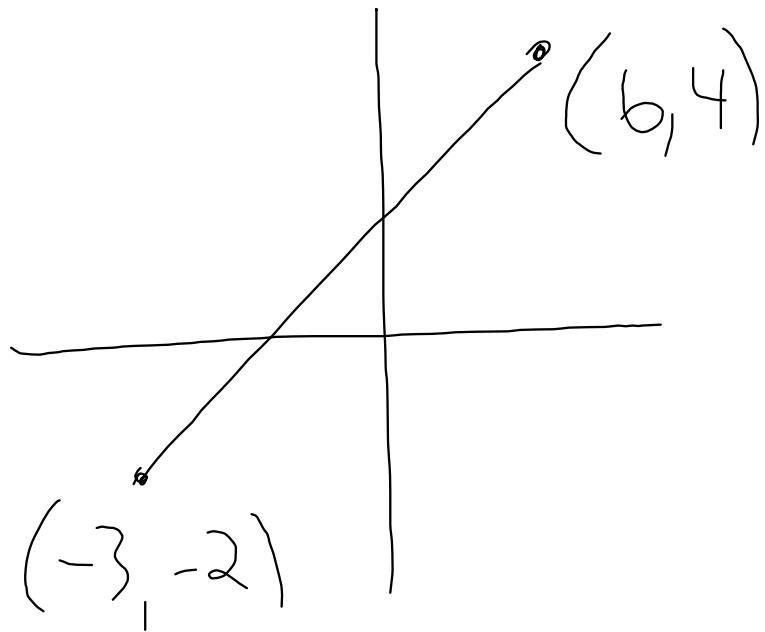


Oct 19/07

THE DISTANCE FORMULA FROM A POINT TO A LINE

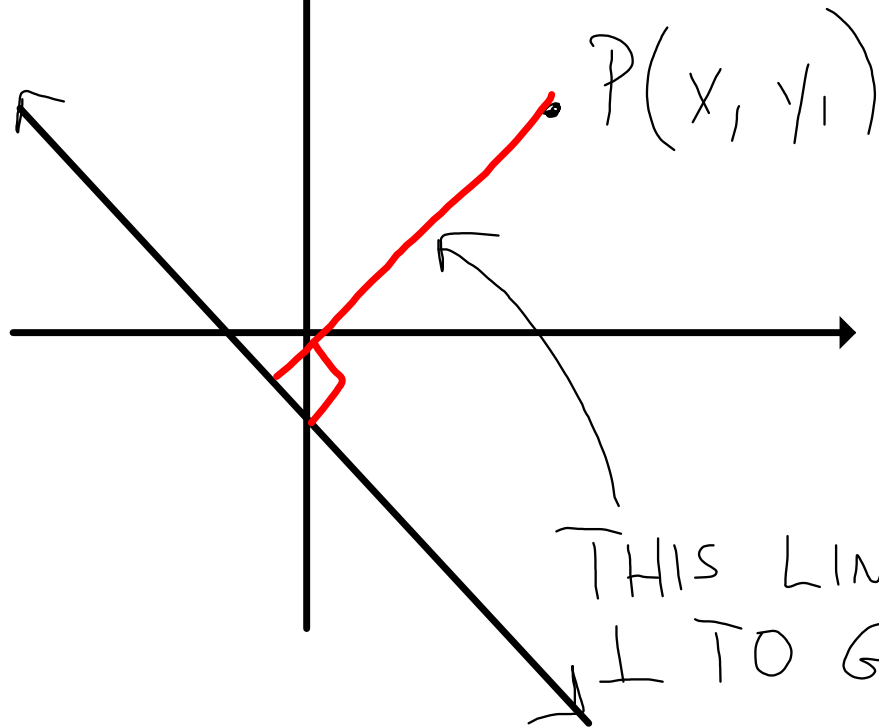


$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

$$d = \sqrt{9^2 + 6^2}$$

$$d = \sqrt{117}$$

$$Ax + By + C = 0$$



$P(x_1, y_1)$

$$d = \frac{|Ax_1 + By_1 + C|}{\sqrt{A^2 + B^2}}$$

THIS LINE IS
PERPENDICULAR TO GIVE THE
SHORTEST DISTANCE

Ex. FIND THE DISTANCE FROM
(2, -3) TO $3x + 4y = 9$

LINE IS $3x + 4y - 9 = 0$

$$d = \frac{|Ax_1 + By_1 + C|}{\sqrt{A^2 + B^2}} = \frac{|3(2) + 4(-3) + (-9)|}{\sqrt{3^2 + 4^2}}$$
$$= \frac{|6 - 12 - 9|}{\sqrt{25}} = \frac{|-15|}{5} = 3$$

EX FIND THE DISTANCE BETWEEN

$$\textcircled{L1} \ y = 3x + 1 \quad \text{AND} \quad \textcircled{L2} \ y = 3x - 9$$

LOCATE A POINT ON $\textcircled{L1}$ $(0, 1)$

$$\textcircled{L2} \ 0 = 3x - y - 9$$

$$d = \frac{|Ax_1 + By_1 + C|}{\sqrt{A^2 + B^2}} = \frac{|3(0) + (-1)(1) + (-9)|}{\sqrt{3^2 + (-1)^2}}$$

$$d = \frac{|-1-9|}{\sqrt{10}} = \frac{10 \times \sqrt{10}}{\sqrt{10} \times \sqrt{10}} = \frac{10\sqrt{10}}{10} = \sqrt{10}$$

EX #22 Q# 11-12, 14, 15-17