YEAR 12 EXCELLENCE OUESTION ON COORDINATE GEOMETRY. Using logical reasoning involving coordinate geometry techniques find the shortest distance from the point $\mathrm{C}(10,7)$ to the line joining $\mathrm{A}(0,1)$ and $\mathrm{B}(3,13)$.
(If you are completely stuck for ideas, use the steps given at the bottom of the page.)


## HINTS:

1. Find the equation of AB
2. Find the equation of the line perpendicular to AB through C
3. Find the intersection point, N
4. Calculate CN

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1. Find the equation of $\mathrm{AB} \quad$ Grad $=4$ equ is $y=4 x+1$
2. Find the equation of the line perpendicular to AB through C

Grad of perp line is $\frac{-1}{4}$ so equ is $y=\frac{-x}{4}+c$ thru $(10,7)$ so $7=\frac{-10}{4}+c$ so $c=9.5 \quad$ Line is $y=\frac{-x}{4}+9.5$
3. Find the intersection point, N by Graphics calc $=N(2,9)$
4. Calculate $\mathrm{CN} \quad C N^{2}=2^{2}+8^{2}$ so $C N=\sqrt{ } 68 \approx 8.246$

MORE EXAMPLES.

| Coords of A | Coords of B | Coords of point P | DISTANCE |
| :--- | :--- | :--- | :--- |
| $(2,9)$ | $(7,14)$ | $(11,6)$ | 8.49 |
| $(0,6)$ | $(10,11)$ | $(7,2)$ | 6.71 |
| $(0,12)$ | $(9,9)$ | $(5,3)$ | 6.96 |
| $(2,12)$ | $(10,8)$ | $(4,2)$ | 8.05 |

$\mathrm{CN}=6.26$
Find the distance of $\mathrm{C}(10,7)$ from AB . Where A is $(2,5)$ and B is $(6,13)$


