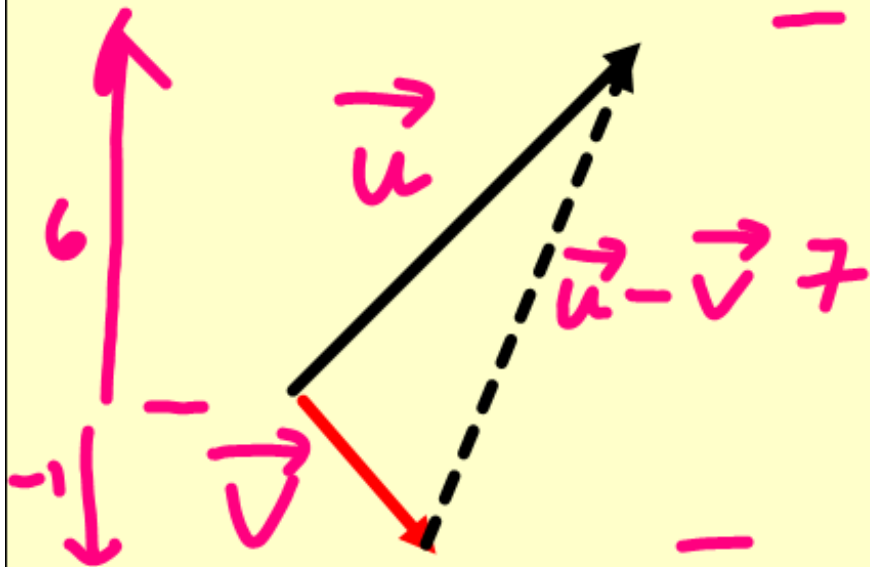


DAY 52 - 10/21 - More Vectors
(§10.2 in textbook)

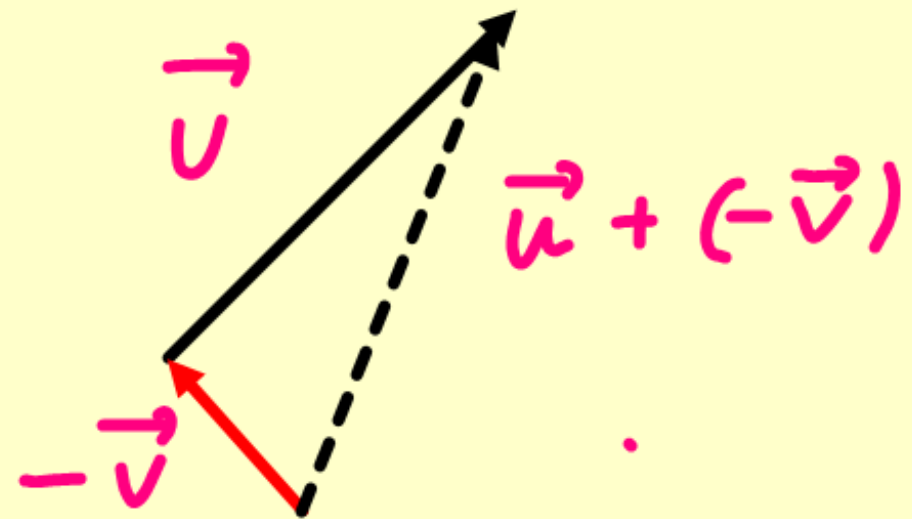
Position Vector $\vec{v} = x\vec{i} + y\vec{j}$

Displacement Vector $\vec{u} - \vec{v}$

Vector subtraction



$$6 - 1 = 7$$



Example 1 (like #5)

If $\vec{v} = 7\vec{i} + 4\vec{j}$ and $\vec{w} = 1\vec{i} + 5\vec{j}$

(a) Find the linear combination $-3\vec{v} + 6\vec{w}$

$$\begin{aligned} &= -3\vec{v} + 6\vec{w} \\ &= -3(7\vec{i} + 4\vec{j}) + 6(1\vec{i} + 5\vec{j}) \\ &= -21\vec{i} - 12\vec{j} + 6\vec{i} + 30\vec{j} \\ &= -15\vec{i} + 18\vec{j} \end{aligned}$$

Example 1 (like #5)

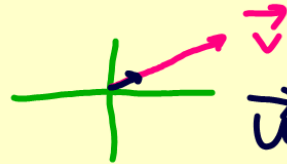
If $\mathbf{v} = 7\mathbf{i} + 4\mathbf{j}$ and $\mathbf{w} = 1\mathbf{i} + 5\mathbf{j}$

(b) Find the unit vector, \mathbf{u} , in the direction of \mathbf{v} . Use the result to find a vector that is 20 units long in the direction of \mathbf{v} .

$$\vec{u} = \frac{\vec{v}}{|\vec{v}|}$$

$$\vec{u} = \frac{7\vec{i} + 4\vec{j}}{\sqrt{7^2 + 4^2}}$$

$$\vec{u} = \frac{7}{8.06}\vec{i} + \frac{4}{8.06}\vec{j}$$



$$\vec{u} = 0.87\vec{i} + 0.49\vec{j}$$

To get a vector 20 units long in direction of \vec{v}

$$\vec{q} = 20\vec{u}$$

$$= 20(0.87\vec{i} + 0.49\vec{j})$$

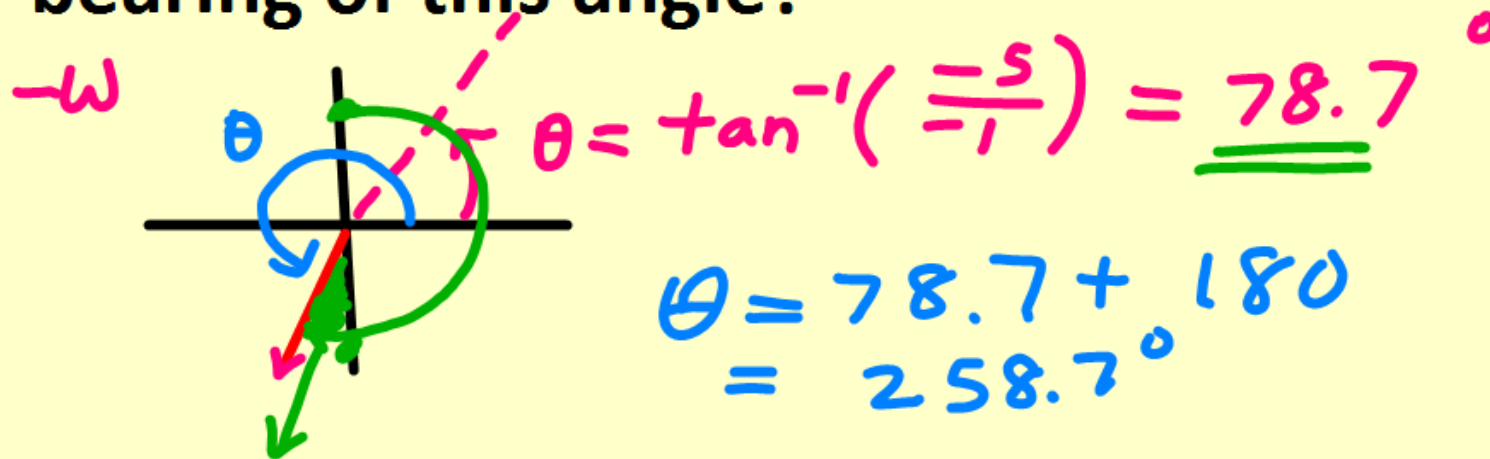
$$= 17.4\vec{i} + 10\vec{j}$$

Example 1 (like #5)

If $v = 7i + 4j$ and $w = 1i + 5j$

$$-w = -1\vec{i} - 5\vec{j}$$

(c) Find the measure of the angle from the positive x-axis to $-w$. What is the bearing of this angle?



$$\begin{aligned}\theta &= 78.7 + 180 \\ &= 258.7^\circ\end{aligned}$$

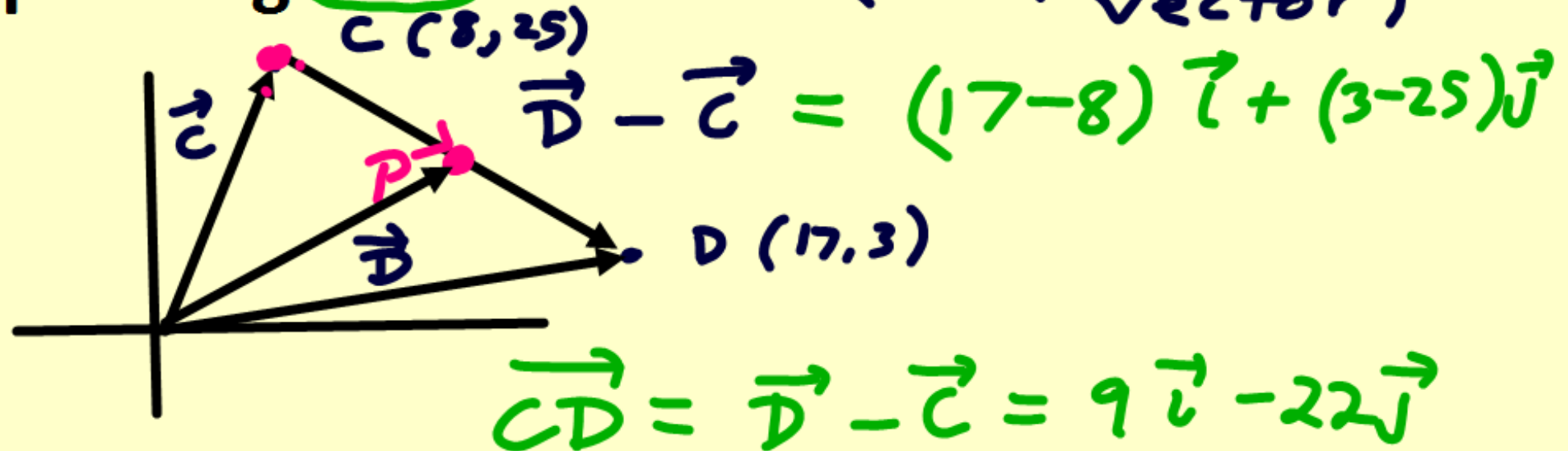
$$270 - 258.7 = 11.3^\circ$$

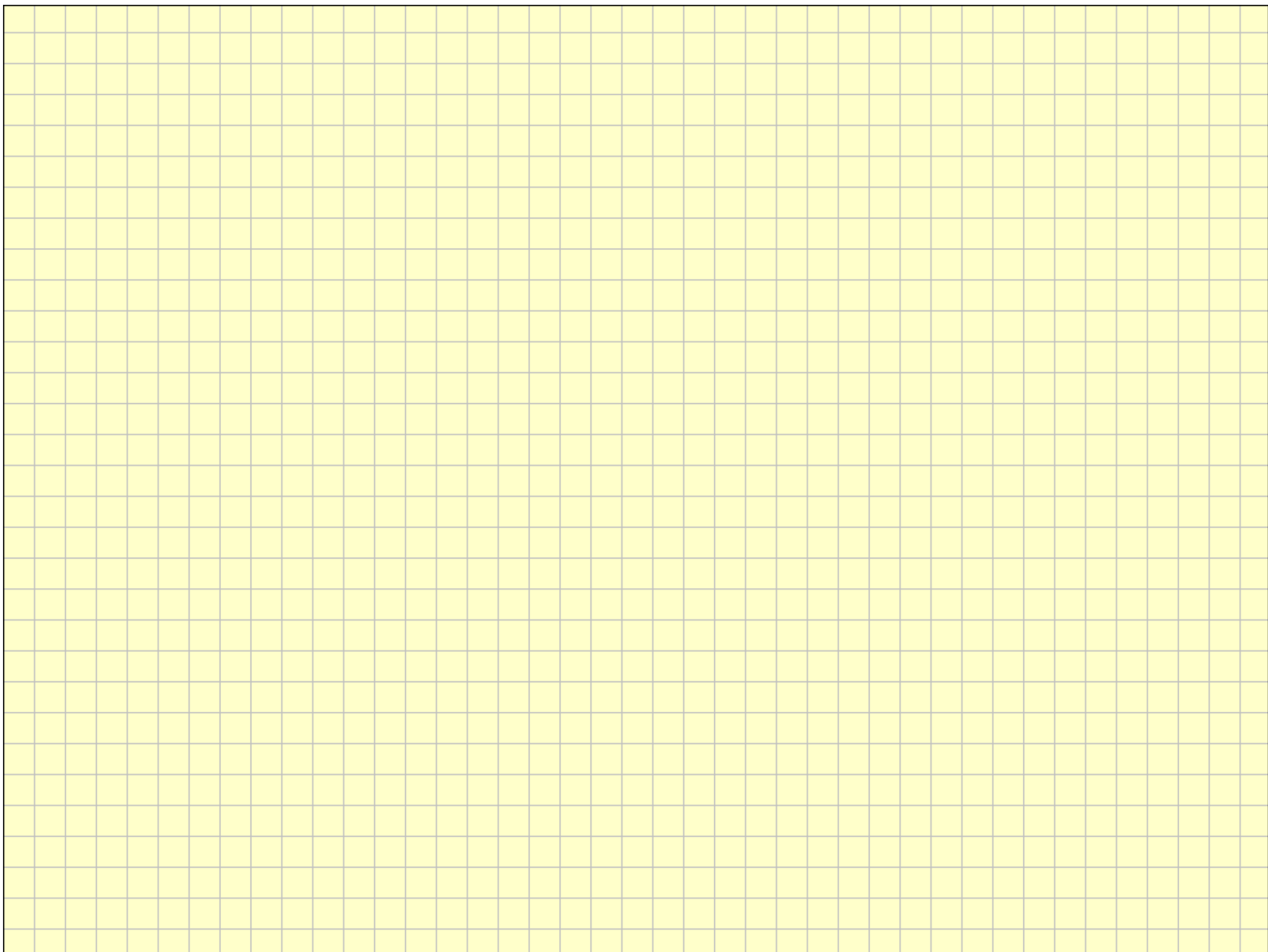
$$\begin{aligned}\text{Bearing} &= 180^\circ + 11.3 \\ &= 191.3^\circ\end{aligned}$$

Example 2 (like #7, 9, 13)

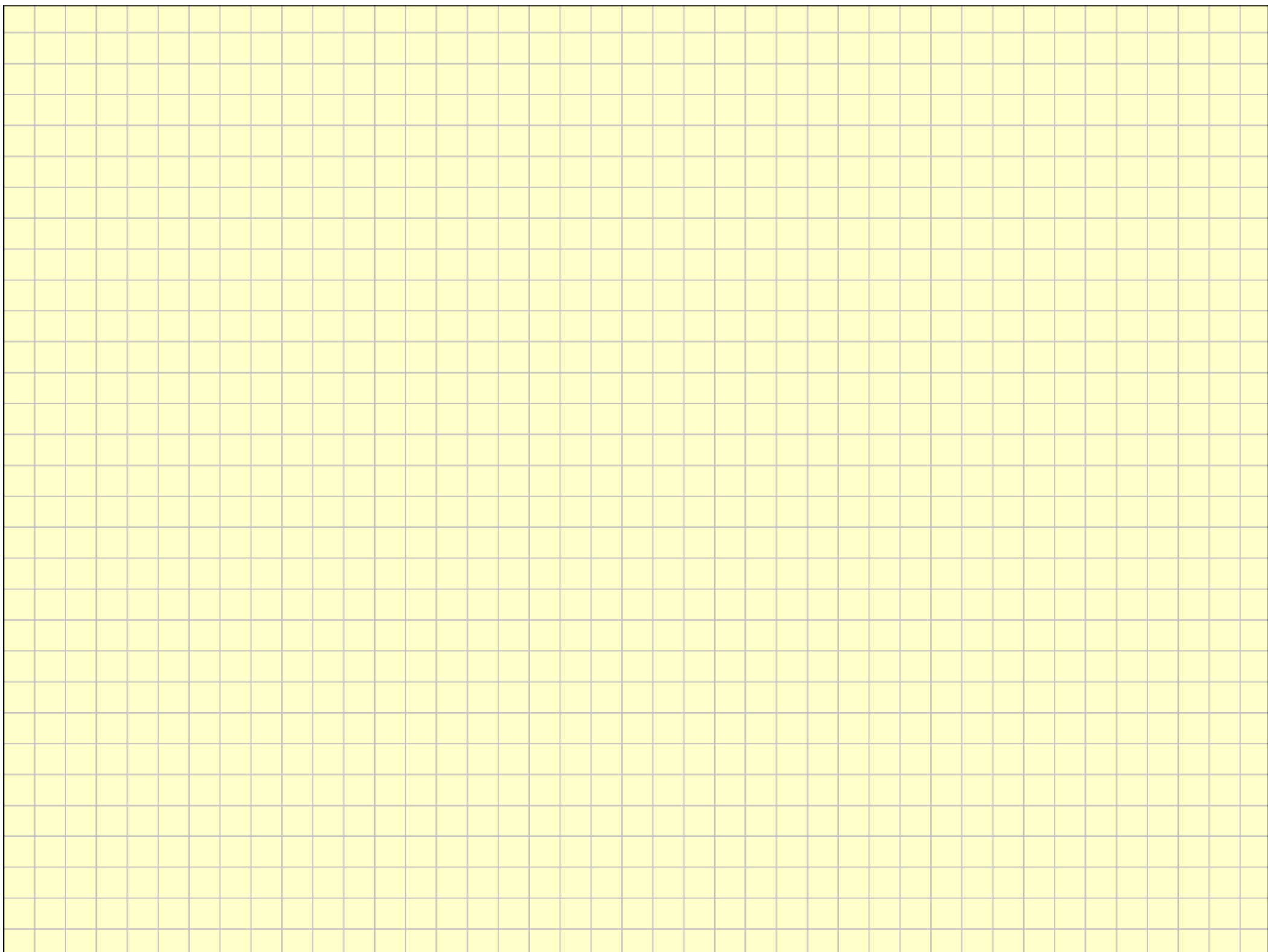
Given points C(8, 25) and D(17,3)

(a) Find the vector \vec{CD} , the vector pointing from C to D. (displacement vector)









Example 2 (like #7, 9, 13)

Given points C(8, 25) and D(17,3)

(b) Find the position vector of the point $\frac{3}{4}$ of the way from C to D.

$$\vec{CD} = 9\vec{i} - 22\vec{j}$$

$$\vec{p} = \vec{c} + \frac{3}{4} \vec{CD}$$

$$\vec{p} = 14.75\vec{i} + 8.5\vec{j}$$

Homework

p. 459 #5 - 13 (odd)