

$$c = \begin{pmatrix} 0 \\ -1 \end{pmatrix}$$

$$b = \begin{pmatrix} 4 \\ -2 \end{pmatrix}$$

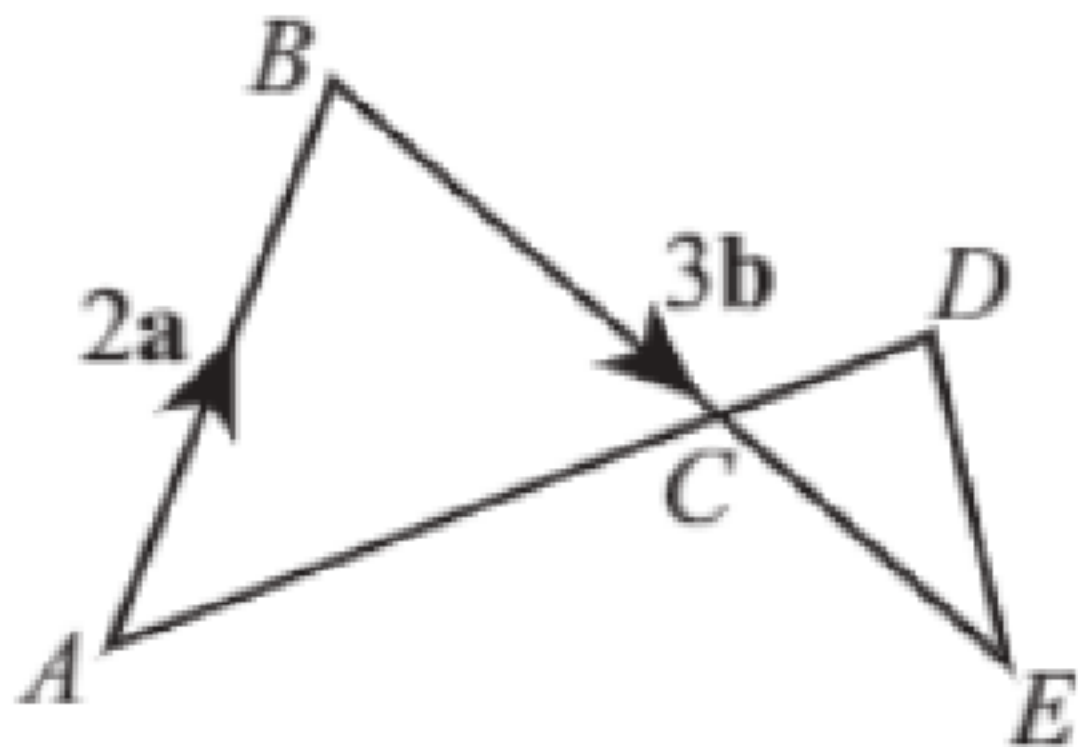
$$a = \begin{pmatrix} 8 \\ 10 \end{pmatrix}$$

$$c + \frac{1}{2}(b - a)$$

$$\begin{pmatrix} 4 \\ -2 \end{pmatrix} - \begin{pmatrix} 8 \\ 10 \end{pmatrix} = \begin{pmatrix} 4-8 \\ -2-10 \end{pmatrix}$$

$$\begin{pmatrix} -4 \\ -12 \end{pmatrix} + \frac{1}{2} \begin{pmatrix} -4 \\ -12 \end{pmatrix} = \begin{pmatrix} -2 \\ -6 \end{pmatrix}$$

$$\begin{pmatrix} 0-2 \\ -1-6 \end{pmatrix} = \begin{pmatrix} -2 \\ -7 \end{pmatrix}$$



$$ac = ab + bc$$

$$= 2a + 3b$$

$$ad = 2:1$$

$$2cd = 1ad$$

$$cd = ad + ac$$

$$2cd = 2a + 3b$$

$$cd = 2a /$$

$$2 + 3b/2$$

$$cd = a + 3b/2$$

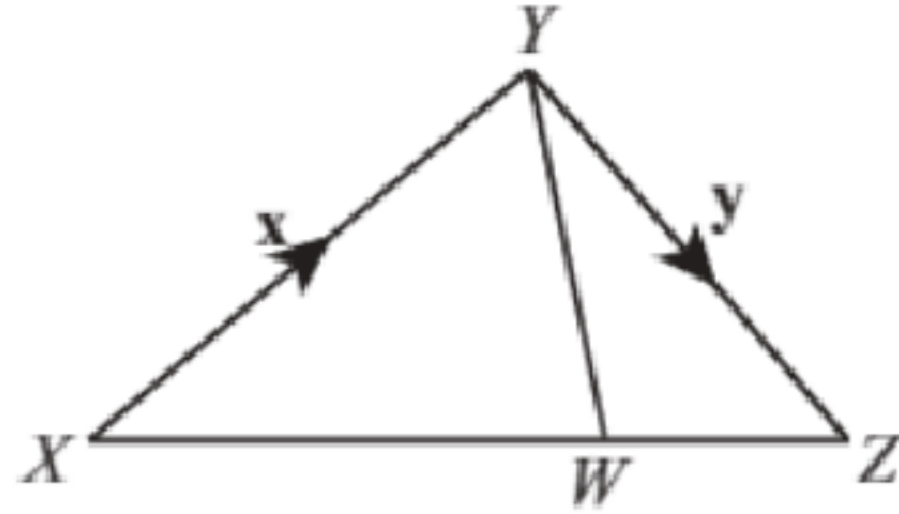
$$ed=ec+cd$$

$$=-b+a+3b/2$$

$$=a-b+3b/2$$

$$=a+b/2$$

$$\begin{array}{r} -b + \underline{3b} \\ -2b^2 + 3b \\ \hline 2 \end{array}$$



$$XY = x$$

$$YZ = y$$

$$WZ = \frac{1}{4}(XZ)$$

$$\begin{aligned} XZ &= XY + YZ \\ &= x + y \end{aligned}$$

$$\begin{aligned} XW &= \frac{3}{4}(XZ) \\ &= \frac{3}{4}(x + y) \end{aligned}$$

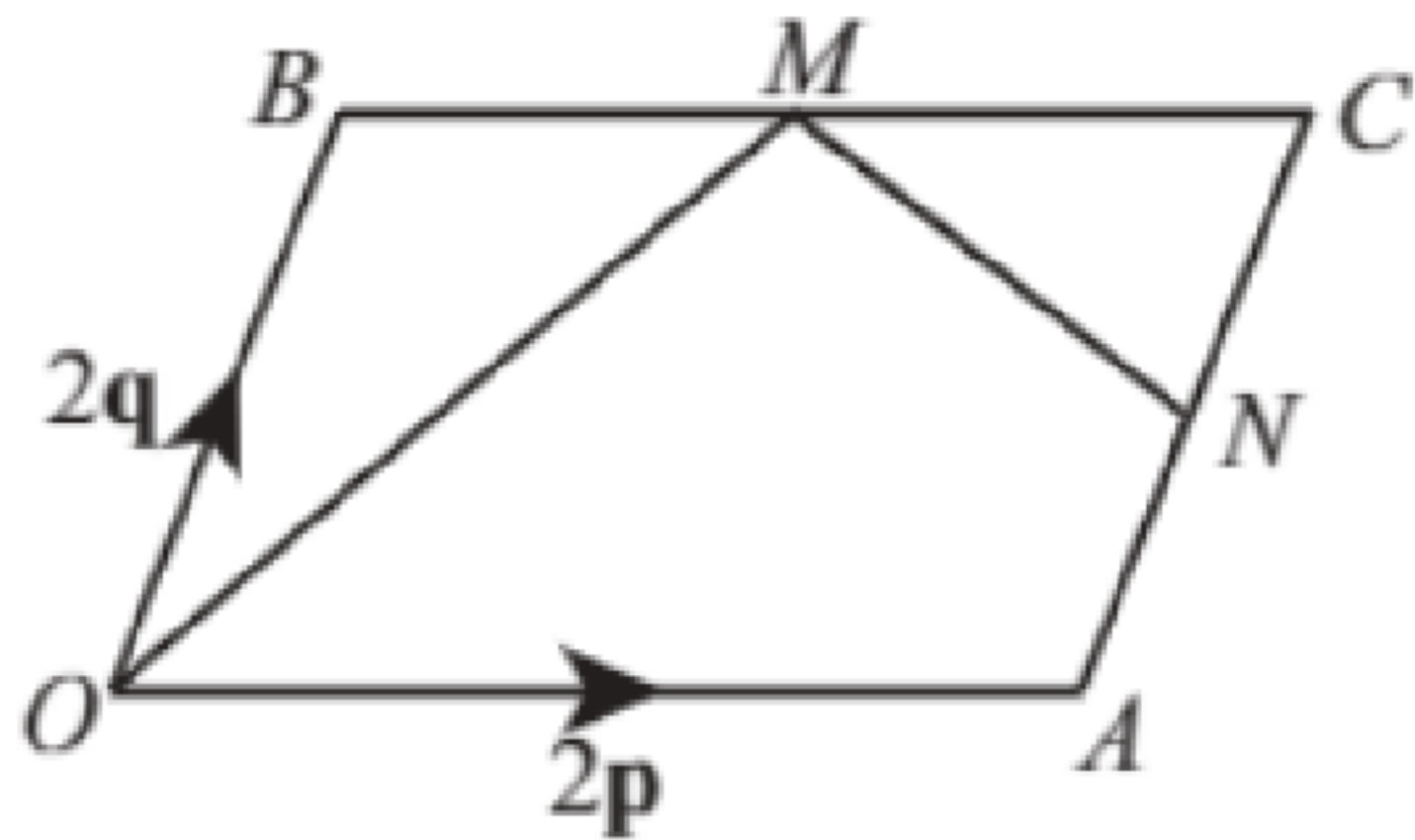
$$YW = YZ + ZW$$

$$\begin{aligned} &= y + \\ &\quad (-\frac{1}{4}(x + y)) \end{aligned}$$

$$\begin{aligned} &= -\frac{1}{4}x + y - \frac{1}{4}y \\ &= -\frac{1}{4}x + \frac{3}{4}y \end{aligned}$$

$$\begin{aligned} &= -\frac{1}{4}x + \frac{3}{4}y \end{aligned}$$

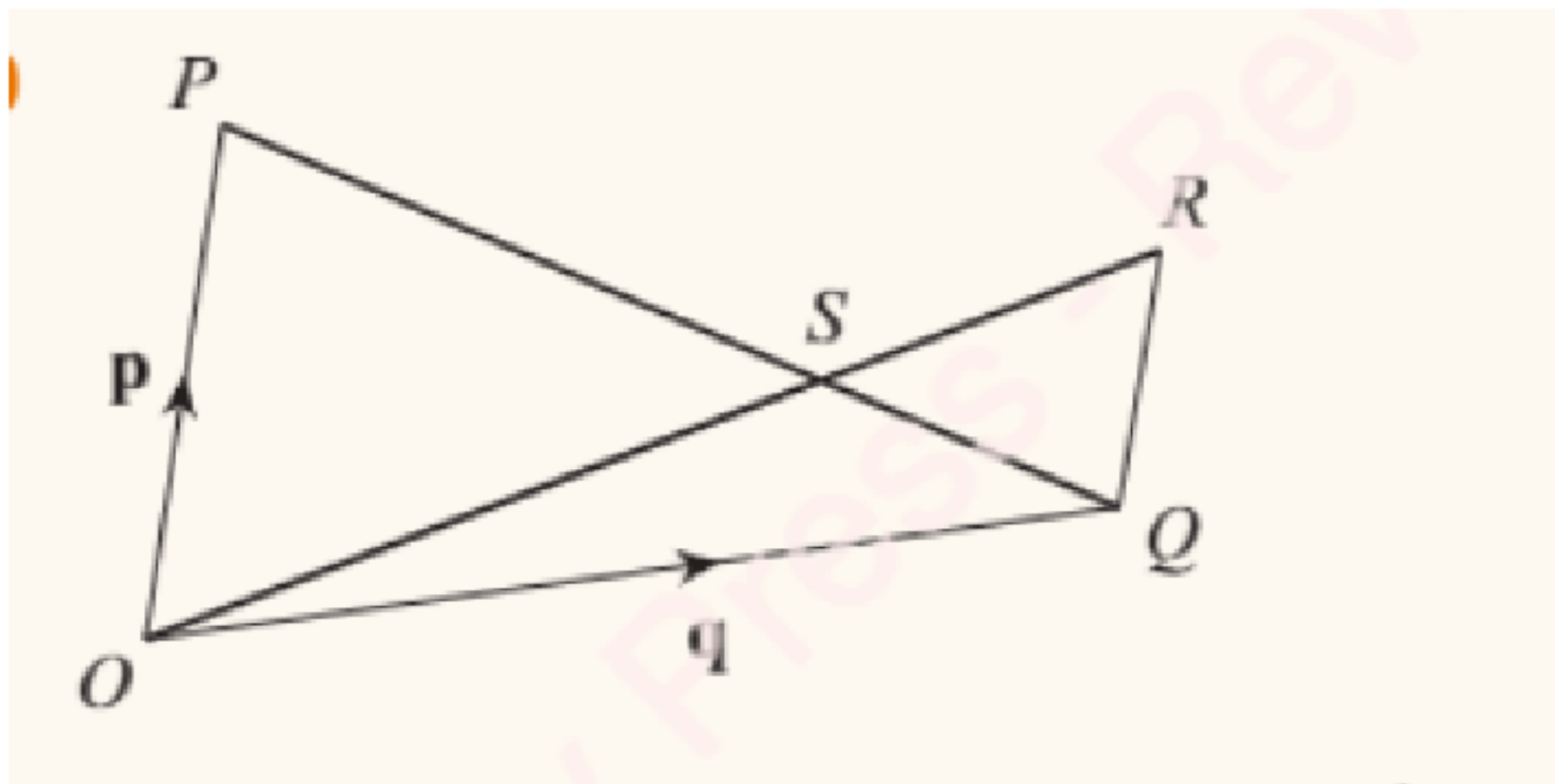
$$\begin{array}{r} y - \frac{1}{4}y \\ \hline 4y - x \\ \hline 4 \end{array}$$



$$\begin{aligned} \vec{AB} &= \vec{OB} + \vec{AO} \\ &= 2\mathbf{q} - 2\mathbf{p} \end{aligned}$$

$$\begin{aligned} \vec{ON} &= \vec{OA} + \vec{AN} \\ &= 2\mathbf{p} + \mathbf{q} \end{aligned}$$

$$\begin{aligned} \vec{MN} &= \vec{MC} + \vec{CN} \\ &= \mathbf{p} - \mathbf{q} \end{aligned}$$



$$OP=p$$

$$OQ=q$$

$$SQ=1/3(PQ)$$

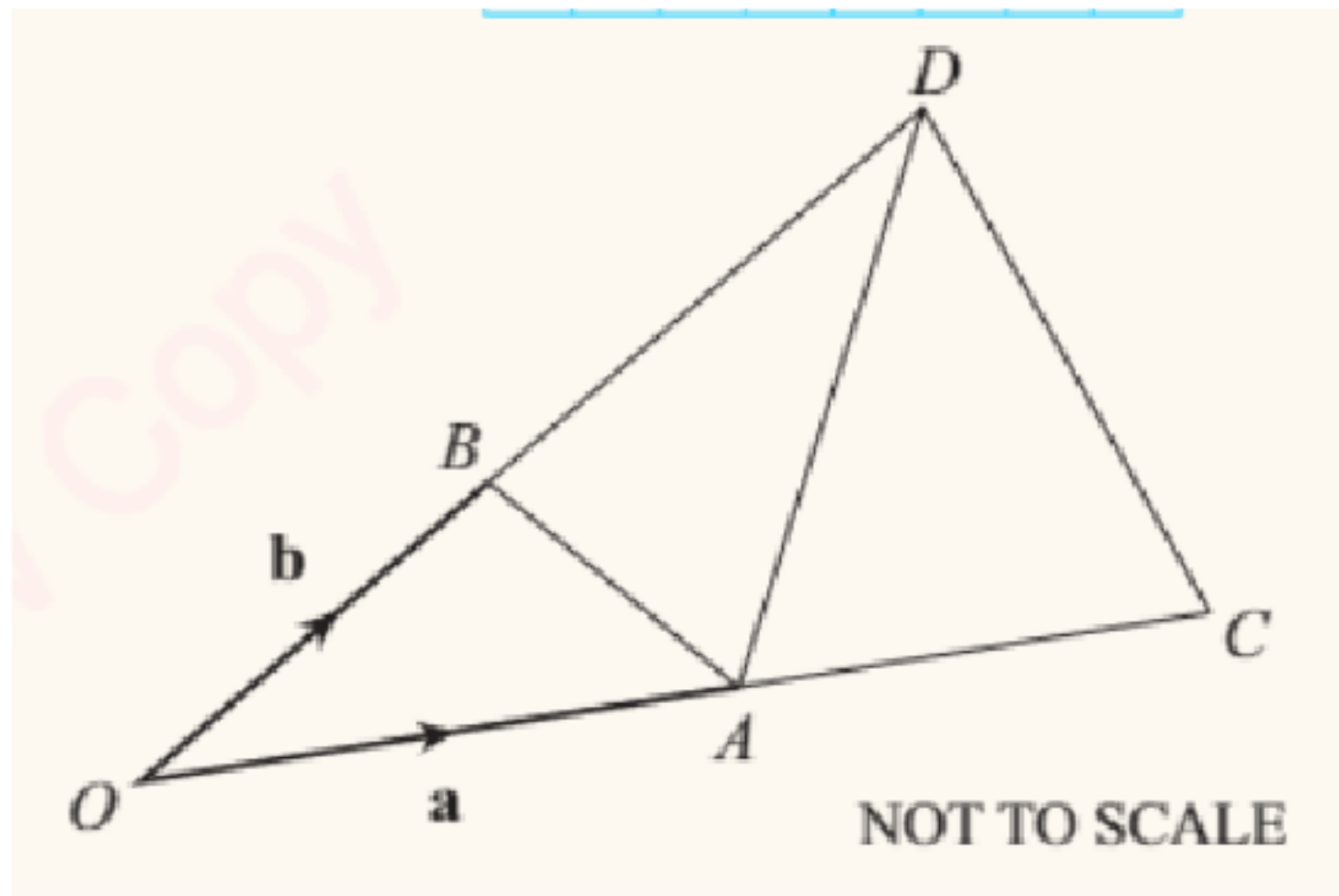
$$QR=1/2(OP)$$

$$\begin{aligned} PS &= 2/3(PQ) \\ &= 2/3(-p+q) \end{aligned}$$

$$\begin{aligned} OS &= OQ + QS \\ &= q - 1/3(PQ) \\ &= q - 1/3(-p+q) \\ &= p/3 + 2/3q \end{aligned}$$

$$\begin{aligned} PQ &= PO + OQ \\ &= -p + q \end{aligned}$$

$$\begin{aligned} OR &= OQ + QR \\ &= q + 1/2(OP) \\ &= q + 1/2p \end{aligned}$$

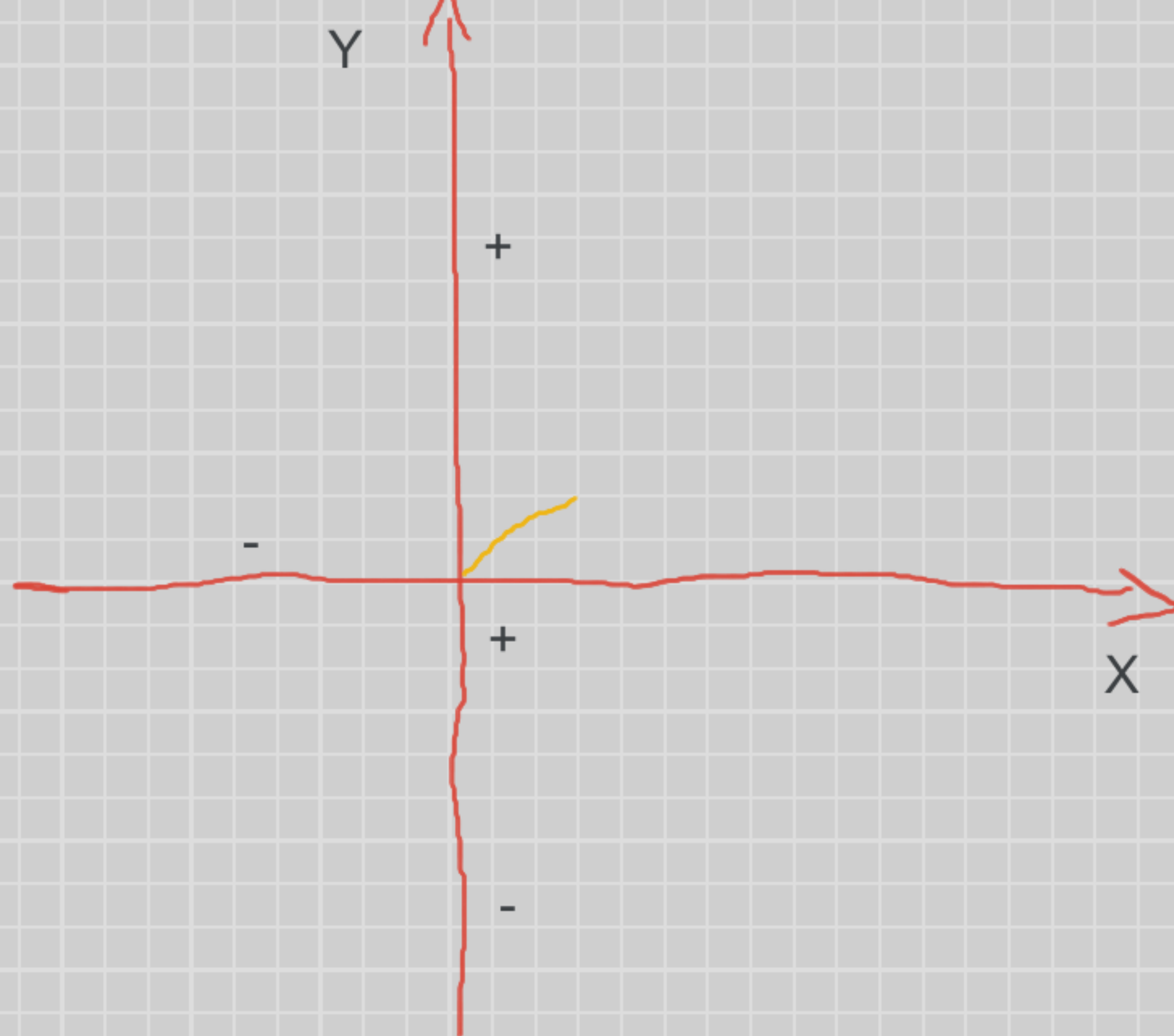


$$\vec{OB} = \vec{OD}$$

$$AC = 2a$$

$$AD = 3b - a$$

$$\begin{aligned} \vec{CD} &= \vec{CA} + \vec{AD} \\ &= -2a + 3b - a \\ &= -3a + 3b \\ &= 3(-a + b) \\ \vec{CD} &= 3\vec{AB} \end{aligned}$$





$$A = \begin{pmatrix} -3 \\ -3 \end{pmatrix}$$

$$B = \begin{pmatrix} 3 \\ 5 \end{pmatrix}$$

$$|AB|$$

$$AB = AO + OB$$

$$= \begin{pmatrix} 3 \\ 3 \end{pmatrix} + \begin{pmatrix} 3 \\ 5 \end{pmatrix}$$

$$= \begin{pmatrix} 6 \\ 8 \end{pmatrix}$$

$$OA = \begin{pmatrix} -3 \\ -3 \end{pmatrix}$$

$$OB = \begin{pmatrix} 3 \\ 5 \end{pmatrix}$$

$$|AB| = \sqrt{6^2 + 8^2}$$

$$|AB| = \sqrt{36 + 64}$$

$$|AB| = \sqrt{100}$$

$$|AB| = 10$$

