3.2.4

ee25btech11063-vejith

Question:
Construct the triangle BD′C′ similar to △BDC with scale factor $\frac{4}{3}$.Draw the line segment D′A′. parallel to DA where A^p prime lies on extended side BA.Is A′BC′D′ a parallelogram?
solution

Point	Name
$\begin{pmatrix}0\\0\end{pmatrix}$	Point A
$\begin{pmatrix}4\\0\end{pmatrix}$	Point B
$\begin{pmatrix}4\\3\end{pmatrix}$	Point C
$\begin{pmatrix}0\\3\end{pmatrix}$	Point D
$\begin{pmatrix}-4/3\\4\end{pmatrix}$	Point D′
$\begin{pmatrix}4\\4\end{pmatrix}$	Point C′
$\begin{pmatrix}-4/3\\0\end{pmatrix}$	Point A′

TABLE 0: Variables Used

consider △BDC.constructs a △BD′C' with scale factor $\frac{4}{3}$.
This means

$$\triangle BD'C' \sim \triangle BDC. \tag{1}$$

$$\frac{BD'}{BD} = \frac{BC'}{BC} = \frac{D'C'}{DC} = \frac{4}{3}. \tag{2}$$

So D′ lies on extension of BD and C′.
Construct A′
Draw D′A′ || DA with A′ on extension of BA.

Check the parallelogram property
1.By construction D′A′ || DA.
But since DA || C′B(by similarity of triangles),we get:

$$D'A' \parallel BC'. \tag{3}$$

2.A′ lies on extended BA,we have :

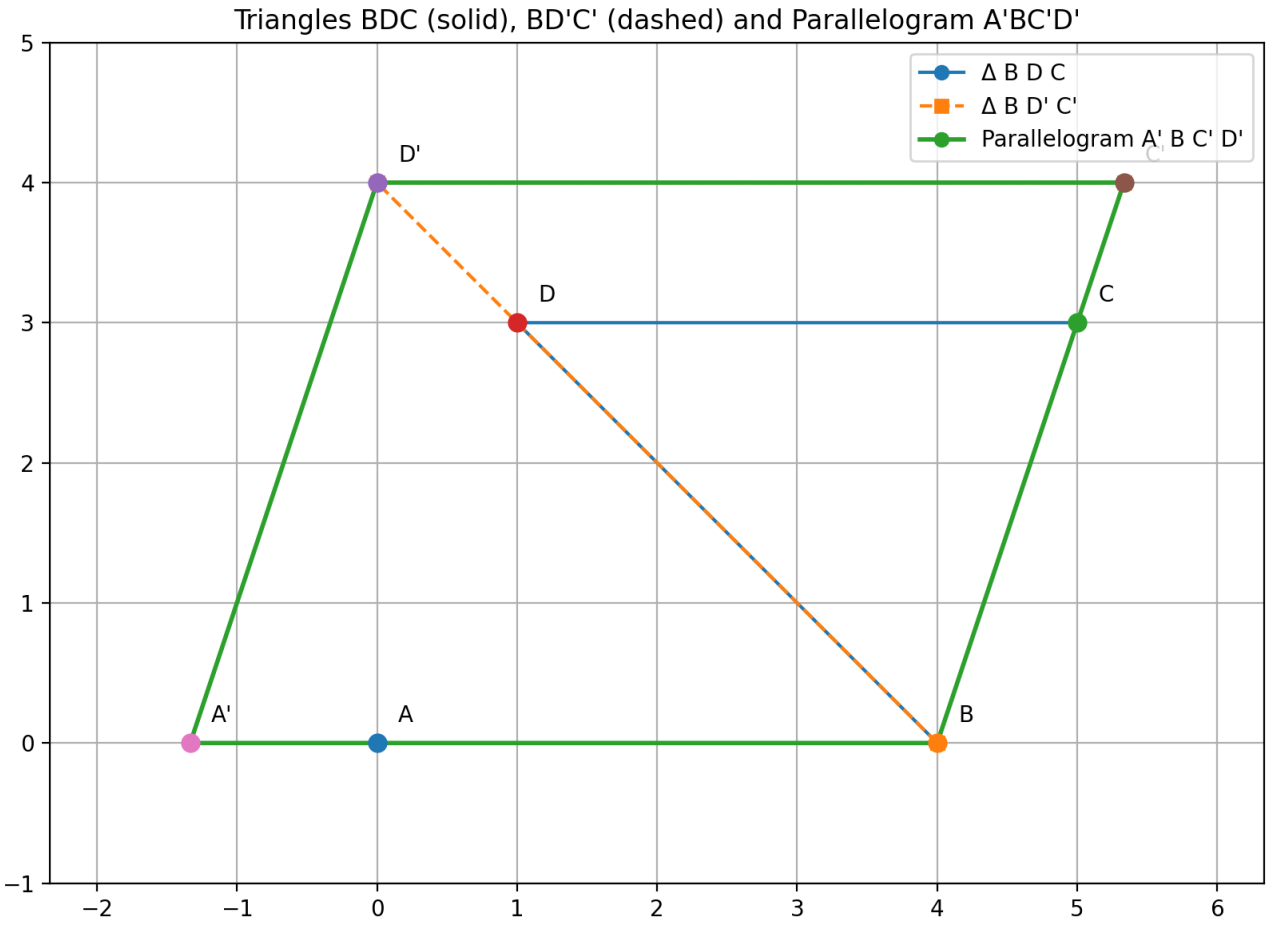
$$A'B \parallel D'C'. \tag{4}$$

Thus:

$$A'B \parallel D'C'. \tag{5}$$

$$D'A' \parallel BC'. \tag{6}$$

so,opposite sides are parallel.
$\implies$ A′BC′D′ is a parallelogram


Triangles BDC (solid), BD'C' (dashed) and Parallelogram A'BC'D'
Δ B D C
Δ B D' C'
Parallelogram A' B C' D'
D'
D
C
A'
A
B
5
4
3
2
1
0
−1
−2
−1
0
1
2
3
4
5
6