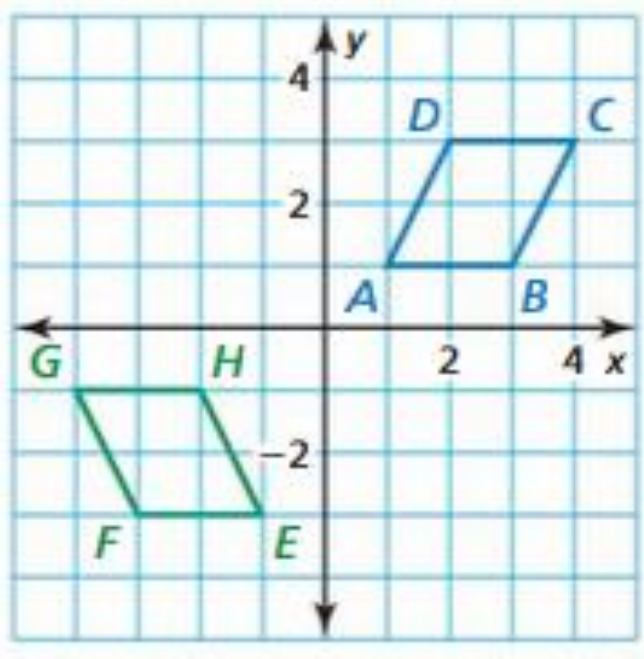
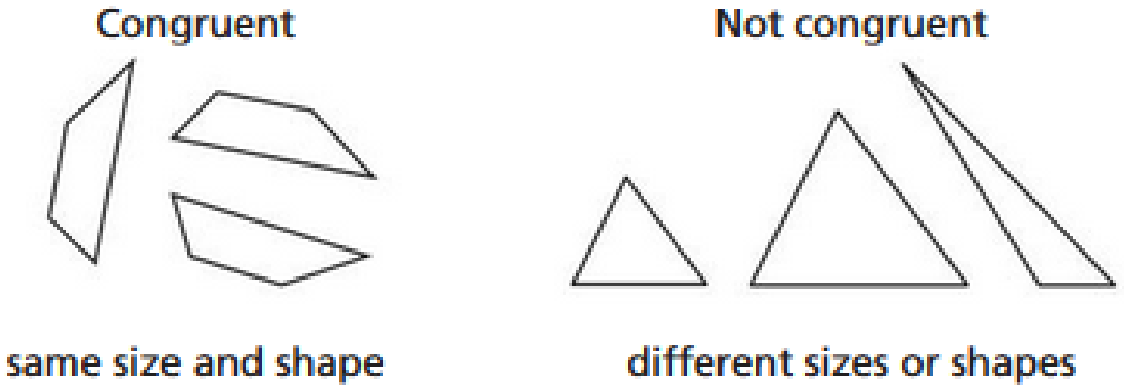
Congruence and Transformations

Section 4.4



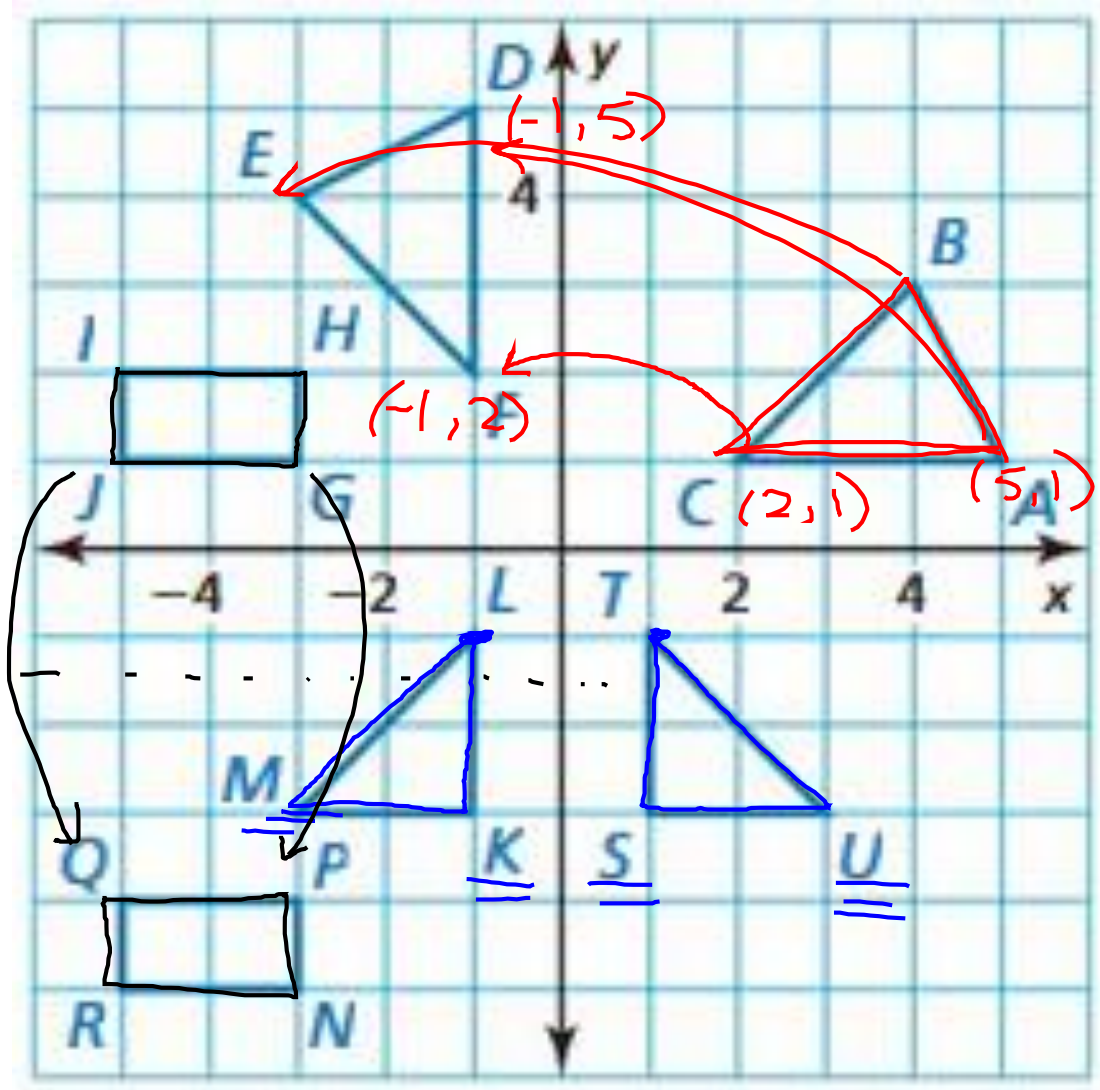
Congruent Figures

- Two figures are congruent *if and only if* there is a rigid motion or a composition of rigid motions that maps one figure onto the other.



- You can identify congruent figures in the coordinate plane by identifying the rigid motion or composition of rigid motions that maps one figure onto the other.

Identify any congruent figures below. Explain.



$\triangle LKM \cong \triangle TSU$

rectangle IIGJ ≅ rectangle QPNR

RNPQ?

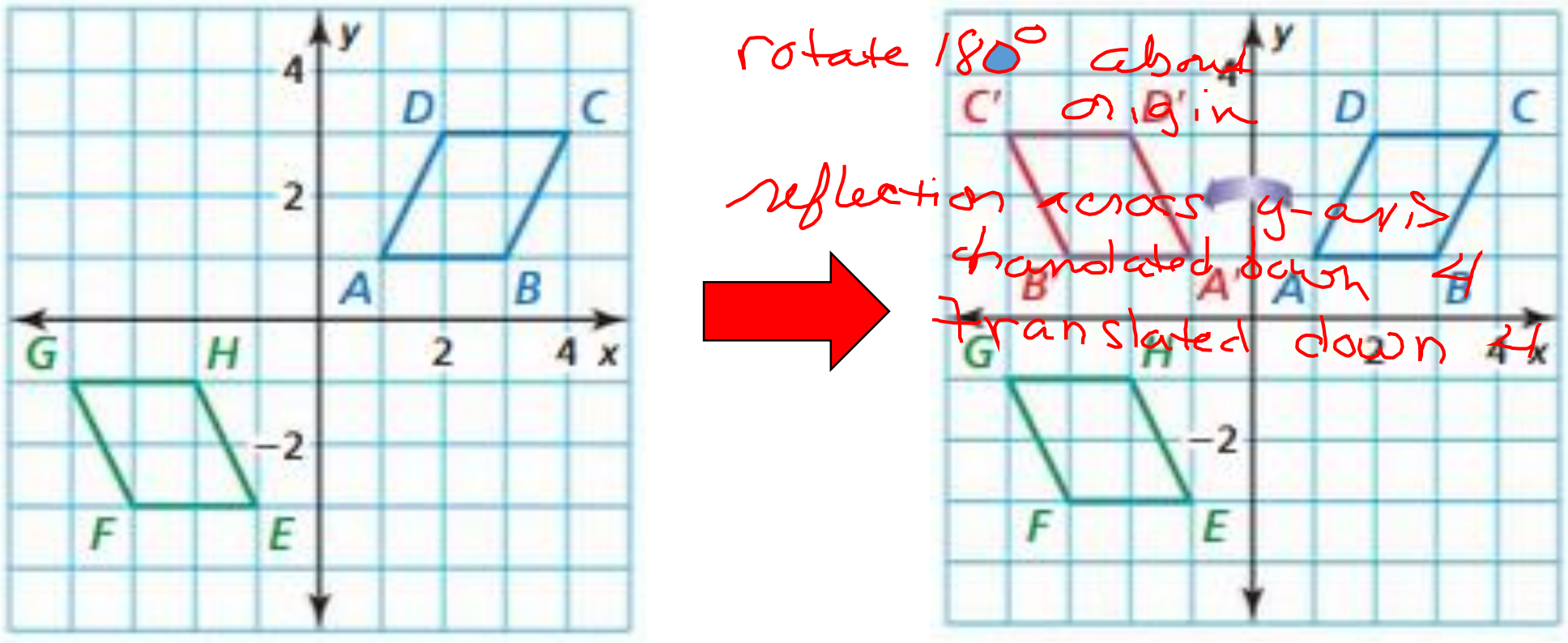
$\triangle ABC \cong \triangle DEF$

$(a,b) \rightarrow (-b,a)$

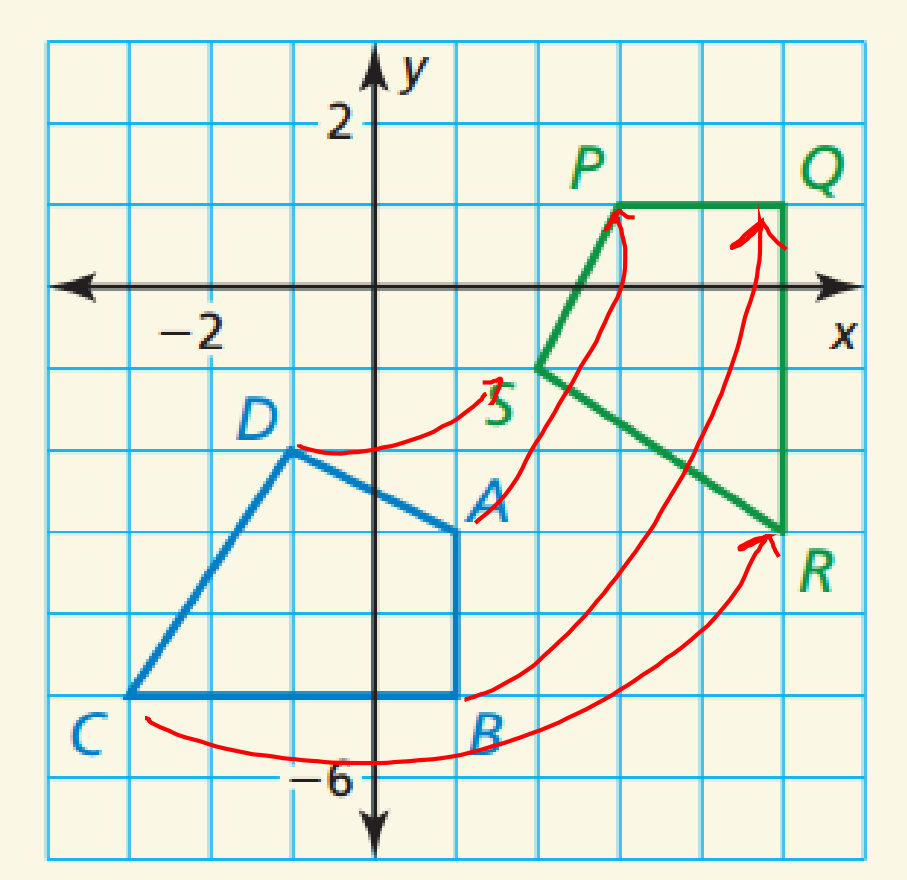
90°

Congruent Transformations

Another name for a rigid motion or composition



Describe a congruence transformation that maps quadrilateral ABCD to quadrilateral PQRS.



clockwise

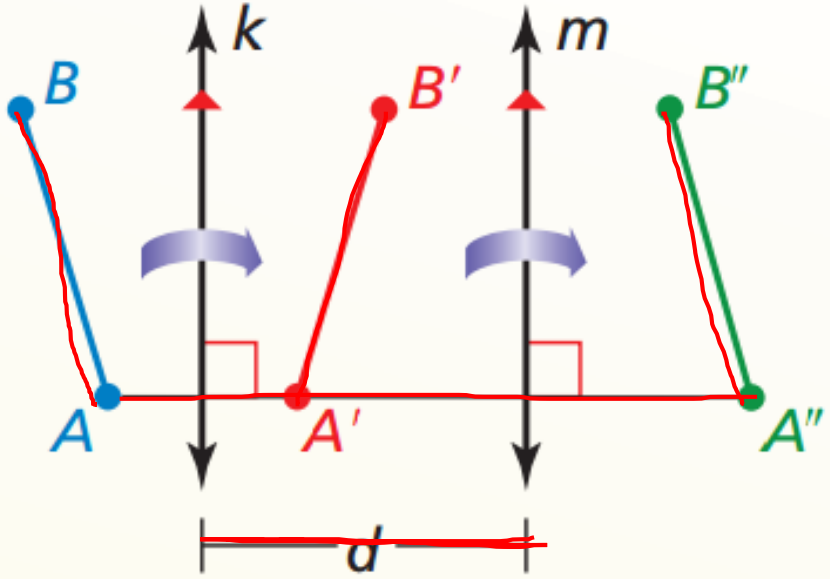
90° rotation about the origin

Theorem 4.2 Reflections in Parallel Lines Theorem

If lines k and m are parallel, then a reflection in line k followed by a reflection in line m is the same as a translation.

If A'' is the image of A, then

1. $\overline{AA''}$ is perpendicular to k and m, and
2. $AA'' = 2d$, where d is the distance between k and m.



In the diagram, a reflection in line a maps $\overline{PQ}$ to $\overline{P'Q'}$. A reflection in line b maps $\overline{P'Q'}$ to $\overline{P''Q''}$. Also, PJ = 3 and LP″ = 8.

Name any segments congruent to

$\overline{PQ}$ $\cong \overline{P'Q'} \cong \overline{P''Q''}$

$\overline{PJ}$ and $\overline{P'J}$

$\overline{QK}$. $\overline{QK}$

Does JK = LM? Explain?

yes JLMK is a rectangle

What is the length of $\overline{P'P''}$?

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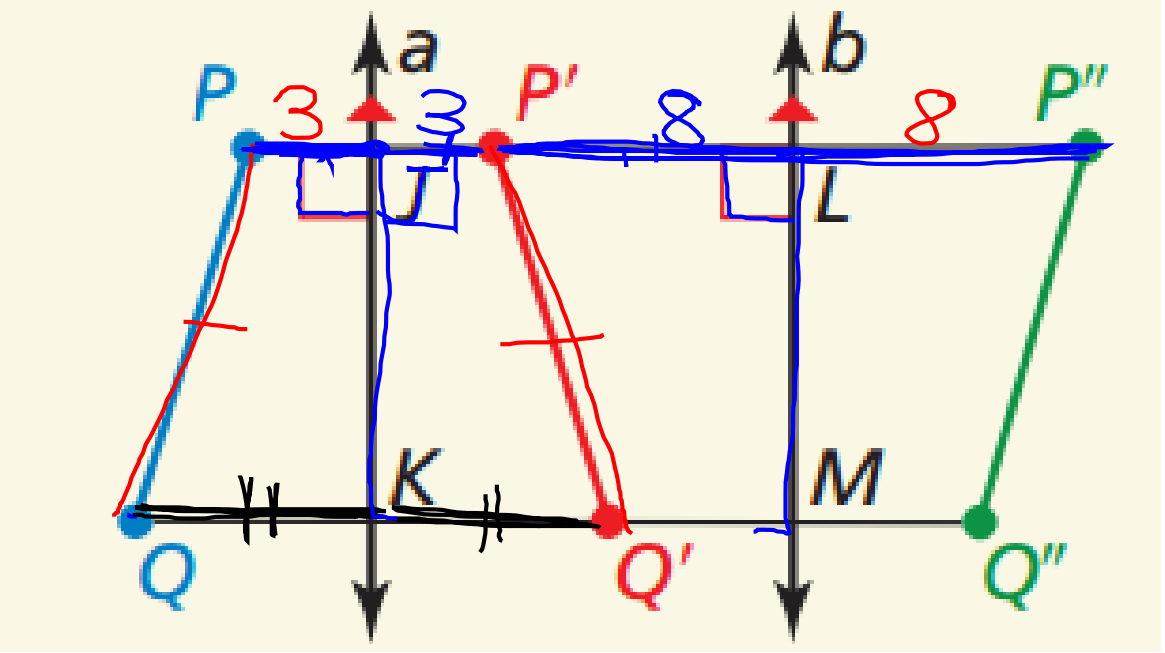
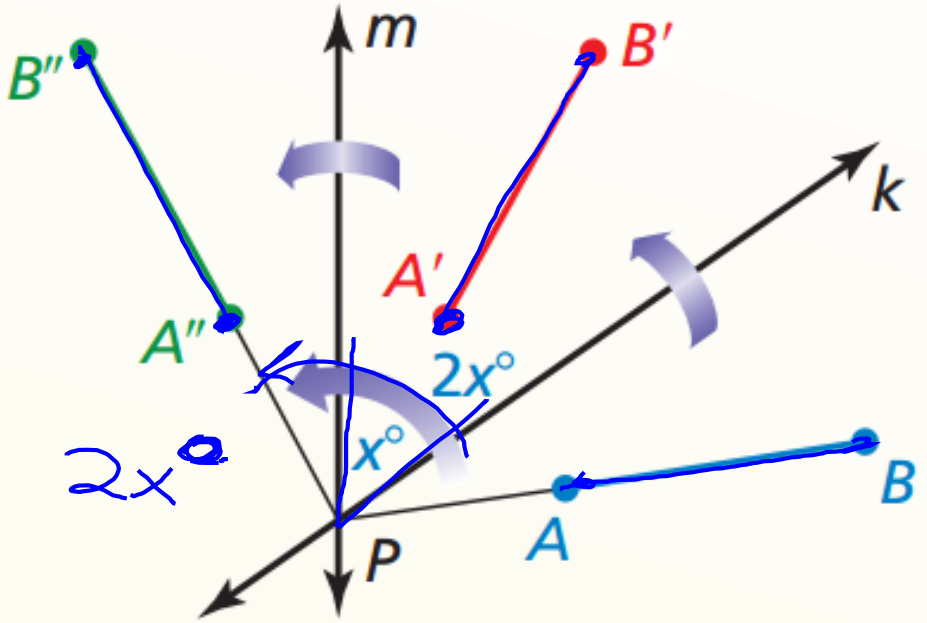


Theorem 4.3 Reflections in Intersecting Lines Theorem

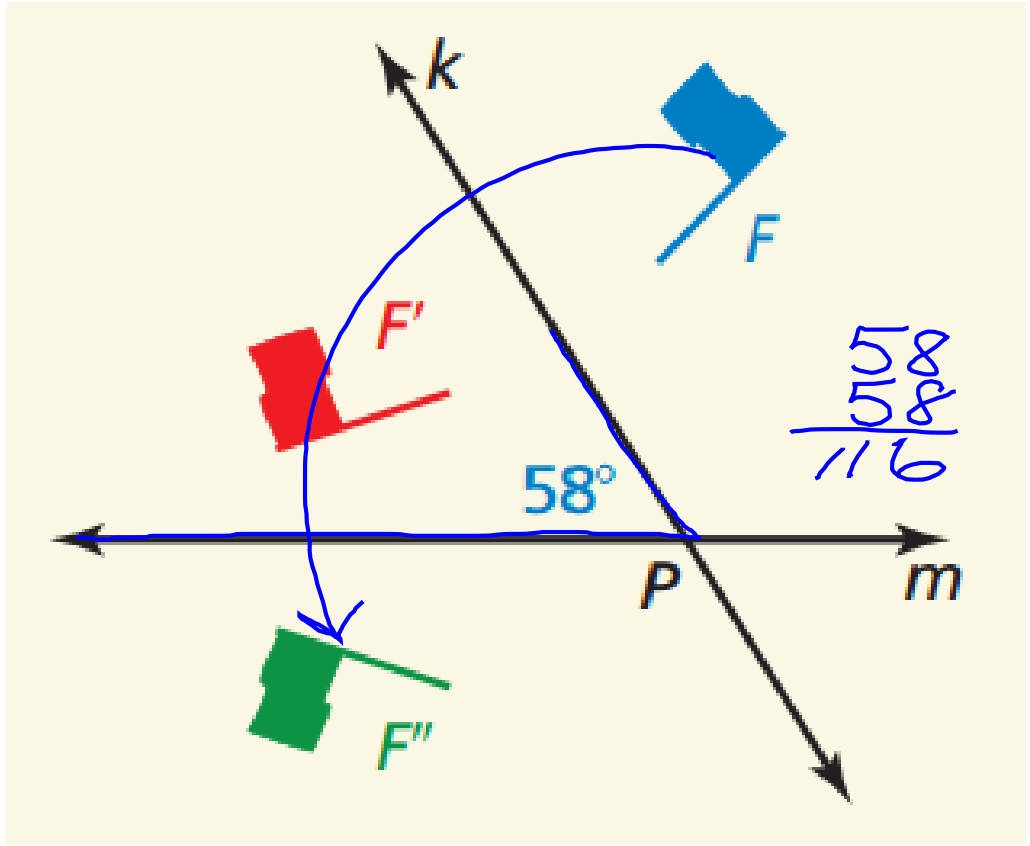
If lines k and m intersect at point P, then a reflection in line k followed by a reflection in line m is the same as a rotation about point P.

The angle of rotation is $2x°$, where $x°$ is the measure of the acute or right angle formed by lines k and m.



$m\angle BPB'' = 2x°$

In the diagram, the figure is reflected in line k. The image is then reflected in line m. Describe a single transformation that maps F to F″.



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