

6.6 Investigate Proportionality

MATERIALS • graphing calculator or computer

QUESTION How can you use geometry drawing software to compare segment lengths in triangles?

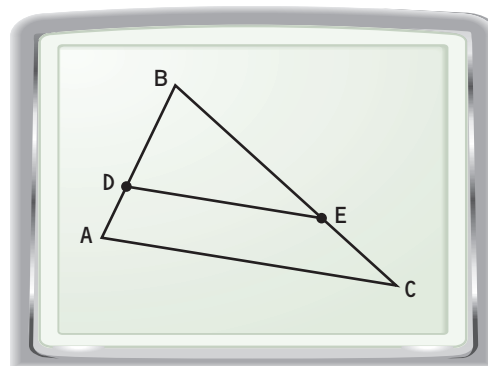
EXPLORE 1 Construct a line parallel to a triangle's third side

STEP 1 Draw a triangle Draw a triangle. Label the vertices A , B , and C . Draw a point on \overline{AB} . Label the point D .

STEP 2 Draw a parallel line Draw a line through D that is parallel to \overline{AC} . Label the intersection of the line and \overline{BC} as point E .

STEP 3 Measure segments Measure \overline{BD} , \overline{DA} , \overline{BE} , and \overline{EC} . Calculate the ratios $\frac{BD}{DA}$ and $\frac{BE}{EC}$.

STEP 4 Compare ratios Move one or more of the triangle's vertices to change its shape. Compare the ratios from Step 3 as the shape changes. Save as "EXPLORE1."

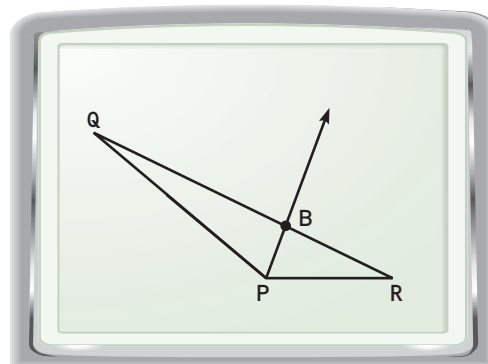


EXPLORE 2 Construct an angle bisector of a triangle

STEP 1 Draw a triangle Draw a triangle. Label the vertices P , Q , and R . Draw the angle bisector of $\angle QPR$. Label the intersection of the angle bisector and \overline{QR} as point B .

STEP 2 Measure segments Measure \overline{BR} , \overline{RP} , \overline{BQ} , and \overline{QP} . Calculate the ratios $\frac{BR}{BQ}$ and $\frac{RP}{QP}$.

STEP 3 Compare ratios Move one or more of the triangle's vertices to change its shape. Compare the ratios from Step 3. Save as "EXPLORE2."



DRAW CONCLUSIONS Use your observations to complete these exercises

1. Make a conjecture about the ratios of the lengths of the segments formed when two sides of a triangle are cut by a line parallel to the triangle's third side.
2. Make a conjecture about how the ratio of the lengths of two sides of a triangle is related to the ratio of the lengths of the segments formed when an angle bisector is drawn to the third side.