




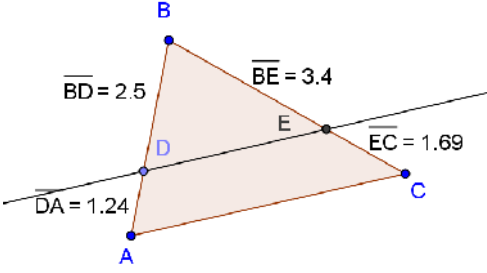

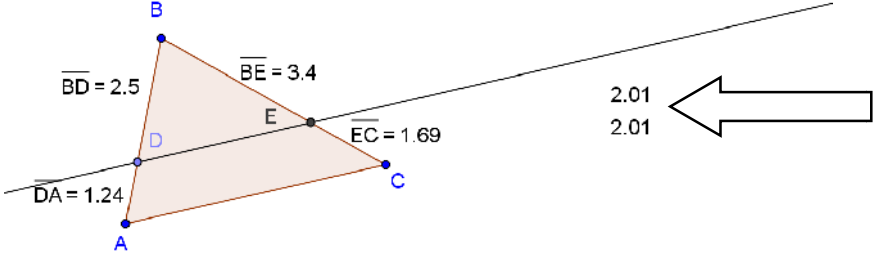




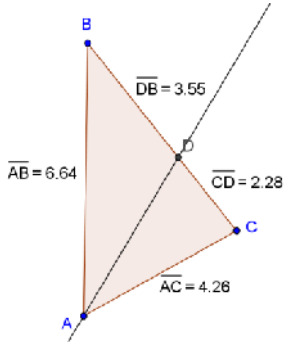


Investigation 1: Proportions in Triangles

	<p>1. Construct triangle ABC.</p>
	<p>2. Construct a point D on \overline{AB}.</p>
	<p>3. Construct a line passing through D parallel to \overline{AC}.</p>
	<p>4. Construct point E, the intersection of the parallel line with \overline{BC}.</p>
	<p>5. Measure \overline{BD}. To use the Distance or Length tool, first click point B, then click point D. Measure \overline{DA}, \overline{BE}, and \overline{EC}.</p>
	
<p>6. Calculate the ratios $\frac{BD}{DA}$ and $\frac{BE}{EC}$. To do this, first select View from the menu and check Algebra View. Find the Dependent Objects in the list that correspond to the four distances measured in the previous step. In the input bar, type distanceBD/distanceDA (making sure the order of the letters matches what appears in the Dependent Objects list). Repeat for distanceBE/distanceEC. Note the label assigned to each ratio calculated.</p> <ul style="list-style-type: none"> Free Objects <ul style="list-style-type: none"> $A = (-2.04, 1.46)$ $B = (-1.34, 5.13)$ $C = (3.09, 2.63)$ Dependent Objects <ul style="list-style-type: none"> $D = (-1.81, 2.68)$ $E = (1.62, 3.46)$ $a = 5.09$ $b = 5.26$ $c = 3.74$ $d: 1.17x - 5.13y = -15.86$ distanceBD = 2.5 distanceBE = 3.4 distanceDA = 1.24 distanceEC = 1.69 $e = 2.01$ $f = 2.01$ poly1 = 9.01 	

	<p>7. Display the ratios $\frac{BD}{DA}$ and $\frac{BE}{EC}$. To do this, use the Text tool. Click the Text tool, then click where you want to insert the text. Type the label of the first ratio (in this example, the label is e). Repeat to display the second ratio (in this example, the second ratio label is f).</p> 
	<p>8. Manipulate the vertices of the triangle. What do you notice about the ratios $\frac{BD}{DA}$ and $\frac{BE}{EC}$?</p> <p>Manipulate point D on the triangle. What do you notice about the ratios $\frac{BD}{DA}$ and $\frac{BE}{EC}$?</p>

Investigation 2: Proportions in Triangles

	<p>1. Construct triangle ABC.</p>
	<p>2. Bisect $\angle A$ using the Angle Bisector tool. To do this, select the Angle Bisector tool and then click points B, A, and C, in that order.</p>
	<p>3. Construct point D, the intersection of \overline{BC} and the bisector of $\angle A$.</p>
	<p>4. Measure \overline{AC}, \overline{AB}, \overline{CD}, and \overline{DB}.</p> 

5. Calculate the ratios $\frac{AC}{AB}$ and $\frac{CD}{DB}$.

Free Objects

$A = (0.12, -2.18)$

$B = (0.22, 4.46)$

$C = (3.84, -0.1)$

Dependent Objects

$D = (2.42, 1.68)$

$a = 5.82$

$b = 4.26$

$c = 6.64$

$d: -0.86x + 0.51y = -1.22$

distanceAB = 6.64

distanceAC = 4.26

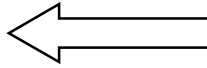
distanceCD = 2.28

distanceDB = 3.55

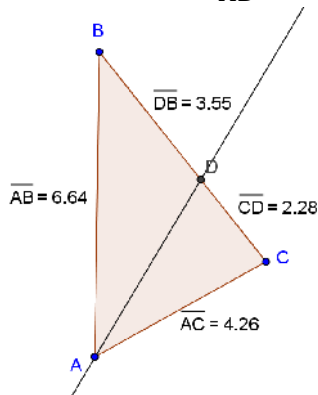
$e = 0.64$

$f = 0.64$

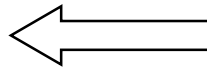
poly1 = 12.25



9. Display the ratios $\frac{AC}{AB}$ and $\frac{CD}{DB}$.



0.64
0.64





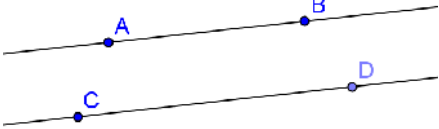


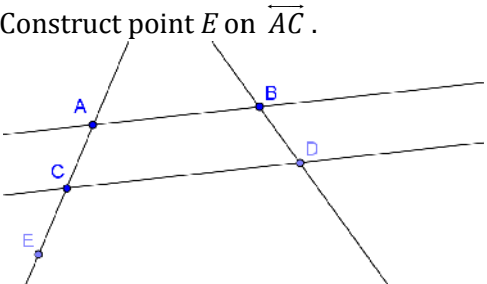


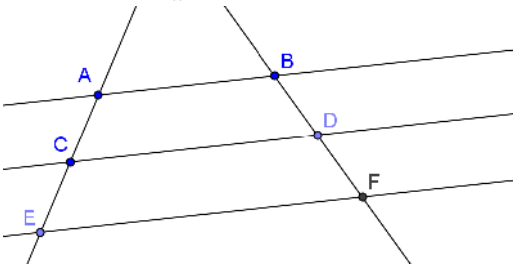




10. Manipulate the vertices of the triangle. What do you notice about the ratios

$\frac{AC}{AB}$ and $\frac{CD}{DB}$?



Investigation 3: Proportions in Triangles

	<p>1. Construct \overline{AB}.</p>
  	<p>2. Construct $\overline{CD} \parallel \overline{AB}$.</p> 
	<p>3. Construct \overline{AC} and \overline{BD}.</p>
	<p>4. Construct point E on \overline{AC}.</p> 
 	<p>5. Construct $\overline{EF} \parallel \overline{AB}$ with F the intersection of \overline{EF} and \overline{BD}.</p> 
	<p>6. Measure \overline{AC}, \overline{CE}, \overline{BD}, and \overline{DF}.</p>
	<p>7. Calculate the ratios $\frac{AC}{CD}$ and $\frac{BD}{DF}$.</p>
	<p>8. Display the ratios $\frac{AC}{CD}$ and $\frac{BD}{DF}$.</p>
	<p>9. Manipulate points A and B. What do you notice about the ratios $\frac{AC}{CD}$ and $\frac{BD}{DF}$?</p>