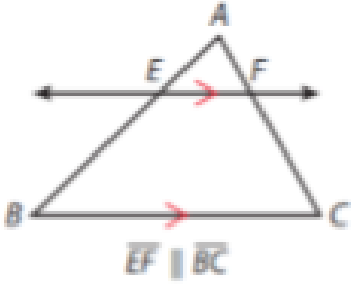
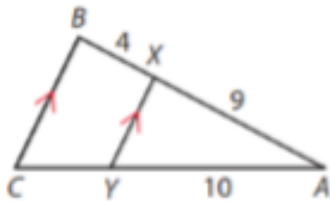


TRIANGLE PROPORTIONALITY

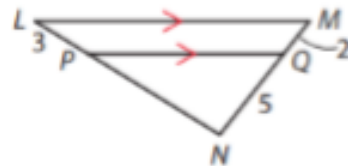
Triangle Proportionality Theorem		
Theorem	Hypothesis	Conclusion
<p>If a line parallel to a side of a triangle intersects the other two sides, then it divides those sides proportionally.</p>		$\frac{AE}{EB} = \frac{AF}{FC}$

Practice:

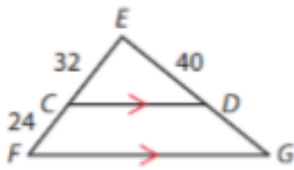
1. Find CY



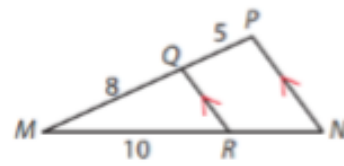
2. Find PN



3. Find DG



4. Find RN



Converse

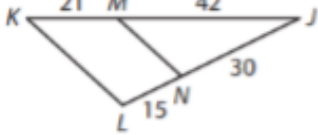
Converse of the Triangle Proportionality Theorem		
Theorem	Hypothesis	Conclusion
If a line divides two sides of a triangle proportionally, then it is parallel to the third side.	$\frac{AE}{EB} = \frac{AF}{FC}$	$\vec{EF} \parallel \vec{BC}$

$$\Delta ABC \sim \Delta XYZ.$$

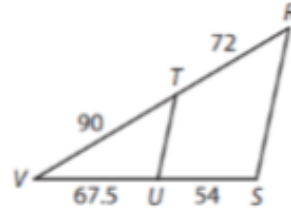
Practice:

Verify that the lines are parallel.

5.

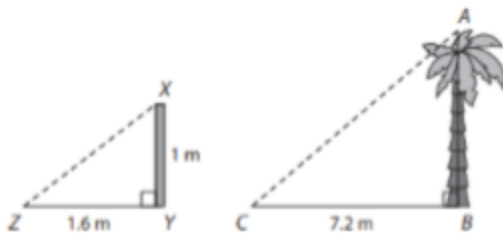


6.



Finding an unknown height

7. Find the height of the tree.



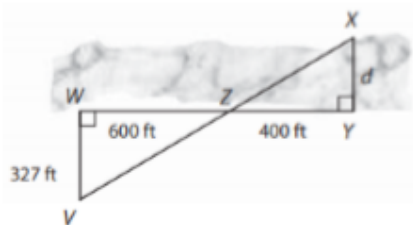
8. Sid is 72 inches tall. To measure a flagpole, Sid stands near the flag. Sid's friend Miranda measure the lengths of Sid's shadow and the flagpole's shadow. Find the height h of the flagpole.



Finding an unknown distance

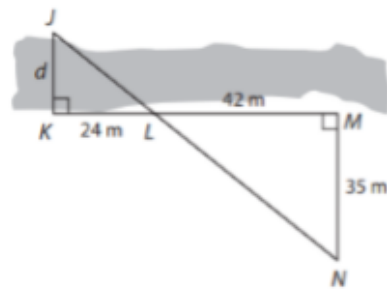
9. A hiker wants to find the distance d across a canyon. She locates points as described.

1. She identifies a landmark at X . She paces a marker (Y) directly across the canyon from X .
2. At Y , she turns 90 degrees & walks 400 feet in a straight line. She places a marker Z at this location.
3. She continues walking another 600 feet & places a marker (W) at this location.
4. She turns 90 degrees away from the canyon & walks until marker Z aligns with X . She places a marker (V) at this location and measure WV .

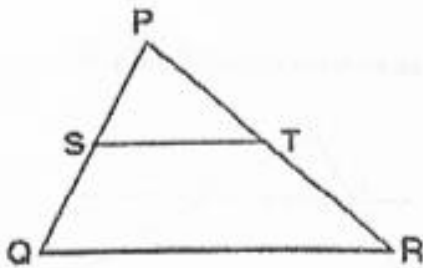


Finding an unknown distance

10. To find the distance the d across the gorge, a student identifies points as shown in the figure. Find d .



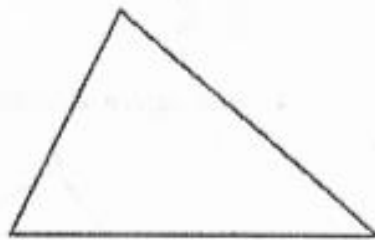
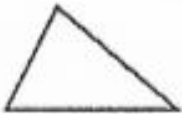
Side-Splitter Theorem



Recall:

- Two polygons are similar if and only if
- corresponding angles are congruent and
 - corresponding sides are proportional

It is helpful to draw the two triangles separately:



Corresponding Angles:

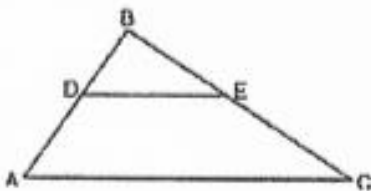
$$\angle \underline{\hspace{1cm}} \cong \angle \underline{\hspace{1cm}}$$

$$\angle \underline{\hspace{1cm}} \cong \angle \underline{\hspace{1cm}}$$

$$\angle \underline{\hspace{1cm}} \cong \angle \underline{\hspace{1cm}}$$

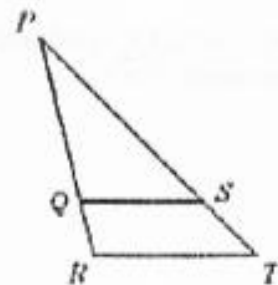
Corresponding Sides:

- (1) In $\triangle ABC$, $\overline{DE} \parallel \overline{AC}$, $DE = 3$, and $AC = 8$. If $BD = 6$, find the measure of AB .



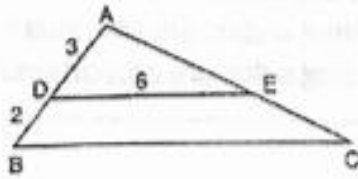
- (2) In $\triangle ABC$, D is a point on \overline{CA} , E is a point on \overline{CB} , and $\overline{DE} \parallel \overline{AB}$. If $CD = 4$, $CA = 6$, and $BC = 9$, find CE .

- (3) In the diagram to the right of $\triangle PRT$, \overline{QS} is parallel to \overline{RT} . If $PR = 8$, $QR = 2$, and $PS = 9$, what is ST ?



G.G.46: Side Splitter Theorem: Investigate proportions among segments of sides of the triangle, given line(s) parallel to one side and intersecting the other sides of the triangle

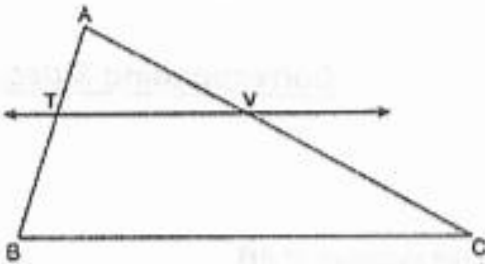
- 1 In the diagram of $\triangle ABC$ below, $\overline{DE} \parallel \overline{BC}$, $AD = 3$, $DB = 2$, and $DE = 6$.



What is the length of \overline{BC} ?

- 1) 12
- 2) 10
- 3) 8
- 4) 4

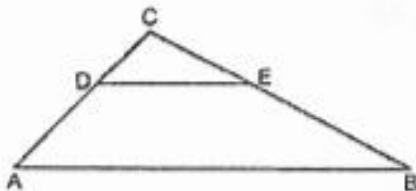
- 2 In the diagram below of $\triangle ABC$, $\overline{TV} \parallel \overline{BC}$, $AT = 5$, $TB = 7$, and $AV = 10$.



What is the length of \overline{VC} ?

- 1) $3\frac{1}{2}$
- 2) $7\frac{1}{7}$
- 3) 14
- 4) 24

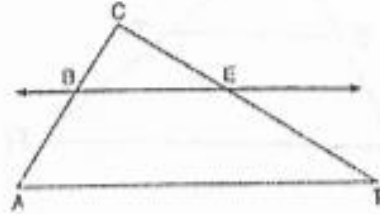
- 5 In the diagram of $\triangle ABC$ below, $\overline{DE} \parallel \overline{AB}$.



If $CD = 4$, $CA = 10$, $CE = x + 2$, and $EB = 4x - 7$, what is the length of \overline{CE} ?

- 1) 10
- 2) 8
- 3) 6
- 4) 4

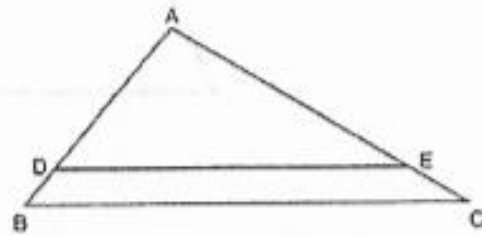
- 3 In the diagram below of $\triangle ACT$, $\overline{BE} \parallel \overline{AT}$.



If $CB = 3$, $CA = 10$, and $CE = 6$, what is the length of \overline{ET} ?

- 1) 5
- 2) 14
- 3) 20
- 4) 26

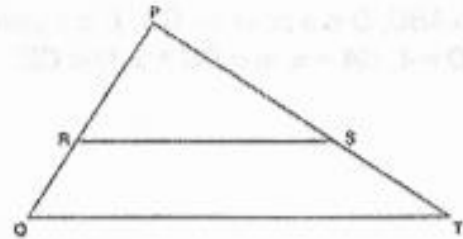
- 4 In the diagram of $\triangle ABC$ shown below, $\overline{DE} \parallel \overline{BC}$.



If $AB = 10$, $AD = 8$, and $AE = 12$, what is the length of \overline{EC} ?

- 1) 6
- 2) 2
- 3) 3
- 4) 15

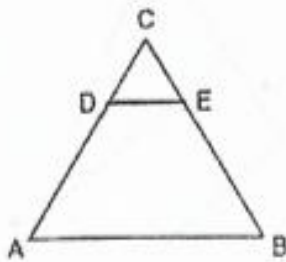
- 6 Triangle PQT with $\overline{RS} \parallel \overline{QT}$ is shown below.



If $PR = 12$, $RQ = 8$, and $PS = 21$, what is the length of \overline{PT} ?

- 1) 14
- 2) 17
- 3) 35
- 4) 38

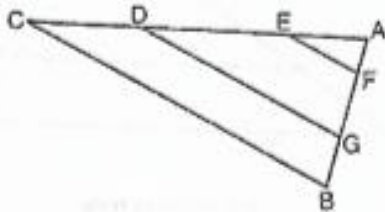
- 7 In the accompanying diagram of equilateral triangle ABC , $DE = 5$ and $DE \parallel AB$.



If AB is three times as long as DE , what is the perimeter of quadrilateral $ABED$?

- 1) 20
- 2) 30
- 3) 35
- 4) 40

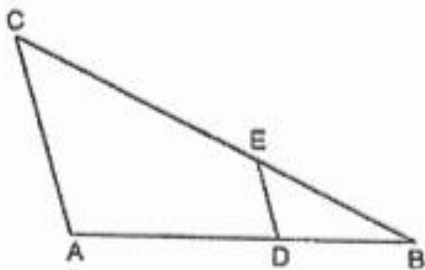
- 9 In the diagram below of $\triangle ABC$, with \overline{CDEA} and \overline{BGFA} , $EF \parallel DG \parallel CB$.



Which statement is false?

- 1) $\frac{AC}{AD} = \frac{AB}{AG}$
- 2) $\frac{AE}{AF} = \frac{AC}{AB}$
- 3) $\frac{AE}{AD} = \frac{EC}{AC}$
- 4) $\frac{BG}{BA} = \frac{CD}{CA}$

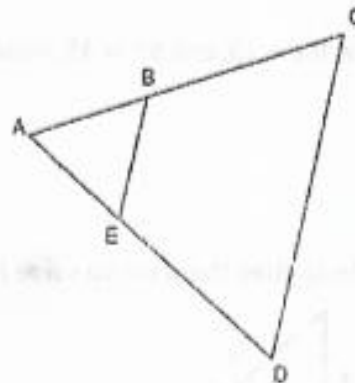
- 10 In the diagram below of $\triangle ABC$, D is a point on \overline{AB} , E is a point on \overline{BC} , $AC \parallel DE$, $CE = 25$ inches, $AD = 18$ inches, and $DB = 12$ inches. Find, to the nearest tenth of an inch, the length of \overline{EB} .



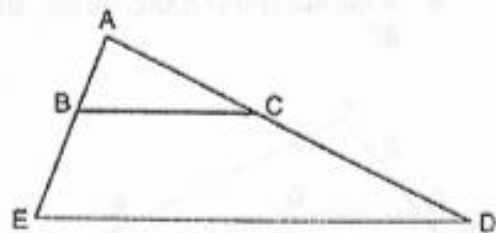
- 8 In $\triangle ABC$, point D is on \overline{AB} , and point E is on \overline{BC} such that $DE \parallel AC$. If $DB = 2$, $DA = 7$, and $DE = 3$, what is the length of \overline{AC} ?

- 1) 8
- 2) 9
- 3) 10.5
- 4) 13.5

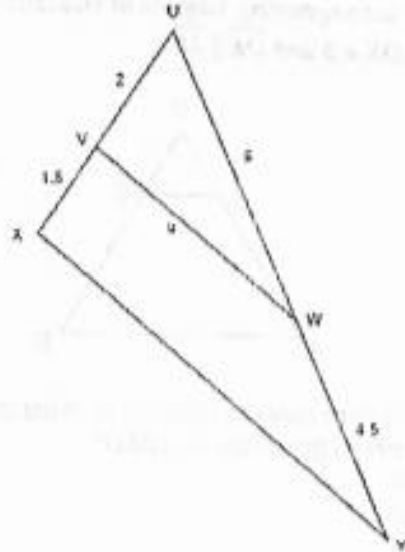
- 11 In the diagram below of $\triangle ACD$, E is a point on \overline{AD} and B is a point on \overline{AC} , such that $EB \parallel DC$. If $AE = 3$, $ED = 6$, and $DC = 15$, find the length of \overline{EB} .



- 12 In the diagram below of $\triangle ADE$, B is a point on \overline{AE} and C is a point on \overline{AD} such that $BC \parallel ED$, $AC = x - 3$, $BE = 20$, $AB = 16$, and $AD = 2x + 2$. Find the length of \overline{AC} .

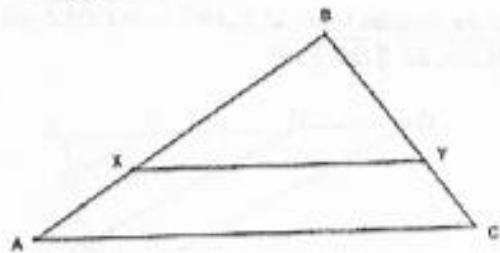


1. Is line segment VW a side-splitter? Justify your answer with algebraic work and a written explanation.



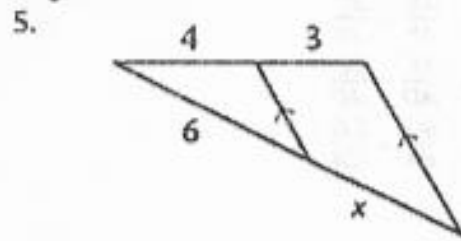
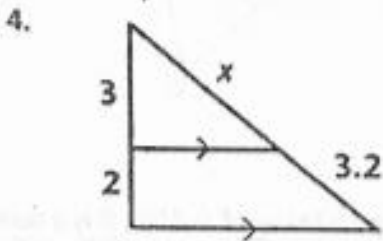
In the diagram at right, $\overline{XY} \parallel \overline{AC}$. Use the diagram to answer the following Problems 2 & 3:

2. If $BX = 4$, $BA = 5$, and $BY = 6$, what is BC ?
3. If $BX = 9$, $BA = 15$, and $BY = 15$, what is YC ?



Not drawn to scale

Use the side-splitter theorem to solve for x in each of the diagrams below.



6. In the diagram of $\triangle ABC$ below, $\overline{DE} \parallel \overline{BC}$, $AD = 3$, $DB = 2$, and $DE = 6$. Find the length of \overline{BC} .

