

## Side-Splitter Theorem

ID: 12318

Time Required  
15 minutes

## Activity Overview

*In this activity, students will explore the side-splitter theorem.*

## Topic: Ratio, Proportion &amp; Similarity

- *Side-Splitter Theorem*

## Teacher Preparation and Notes

- *This activity was written to be explored with the Cabri Jr. app on the TI-84.*
- *Before beginning this activity, make sure that all students have the Cabri Jr. application, and the Cabri Jr. files SIDESP1.8xv, SIDESP 2.8xv, and SIDESP 3.8xv loaded on their TI-84 calculators.*
- ***To download the Cabri Jr. files (.8xv files) and student worksheet, go to [education.ti.com/exchange](http://education.ti.com/exchange) and enter “12318” in the quick search box.***

## Associated Materials

- *GeoWeek20\_Side\_Worksheet\_TI84.doc*
- *SIDESP1.8xv*
- *SIDESP2.8xv*
- *SIDESP3.8xv*

## Suggested Related Activities

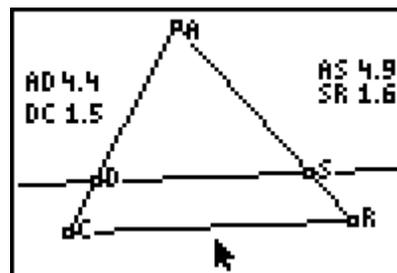
*To download any activity listed, go to [education.ti.com/exchange](http://education.ti.com/exchange) and enter the number in the quick search box.*

- *Cabri Jr. – Side-Splitter Theorem (TI-84 Plus) — 7284*
- *Sail Problem (Parallel Lines & Segment Relationships) (TI-Nspire technology) — 7683*

**Problem 1 – Side-Splitter Theorem**

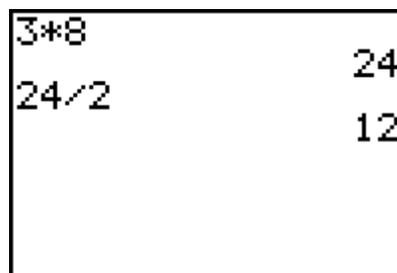
Students will begin this activity by looking at the side-splitter theorem. Students are given a triangle with a segment parallel to one side. They will discover that if a line is parallel to one side of a triangle and intersects the other two sides, then it divides those sides proportionally.

Students will be asked to collect data by moving point A and point D. Students are asked several questions about the relationships in the triangle.



**Problem 2 – Application of the Side-Splitter Theorem**

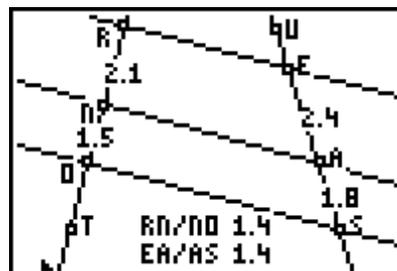
In Problem 2, students will be asked to apply the side-splitter theorem to several homework problems.



**Problem 3 – Extension of the Side-Splitter Theorem**

In Problem 3, students will discover the corollary to the Side-Splitter Theorem: If a line is parallel to one side of a triangle and intersects the other two sides, then it divides those sides proportionally.

Students are asked several questions about the corollary to the side-splitter theorem.



**Student Solutions**

1. Sample answers:

Position	AD	DC	AS	SR	$\frac{AD}{DC}$	$\frac{AS}{SR}$
1	4.1	1.8	4.6	2.0	2.27	2.30
2	3	2.8	3.4	3.2	1.07	1.06
3	2.6	2.4	3.2	3.0	1.08	1.07
4	3.3	3.1	2.5	2.3	1.06	1.08

2. The ratios of the side lengths are equal.

3.  $\frac{AD}{DC} = \frac{AS}{SR}$

4. The ratio remains the same.

 5. The ratio changes when moving point  $D$ .

6. When you move the parallel line, you are changing the proportion between the upper and lower segments. When you move the point, the segments may get longer or shorter, but the proportion stays the same.

7. 12

8. 16.8

9. Sample answers:

Position	RN	NO	EA	AS	$\frac{RN}{NO}$	$\frac{EA}{AS}$
1	2.1	1.5	2.4	1.8	1.4	1.4
2	2.1	1.3	2.7	1.7	1.6	1.6
3	1.9	1.5	2.4	2.0	1.2	1.2
4	2.7	0.7	3.5	0.9	4	4

10. The ratios are equal.

11.  $\frac{RN}{NO}$  and  $\frac{EA}{AS}$  are congruent