

## Questions on Lesson 4.2?

We will be taking our content  
mastery quiz soon!

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$\frac{2}{3} = \frac{3}{4.5} = \frac{3}{4.5}$

SSS~

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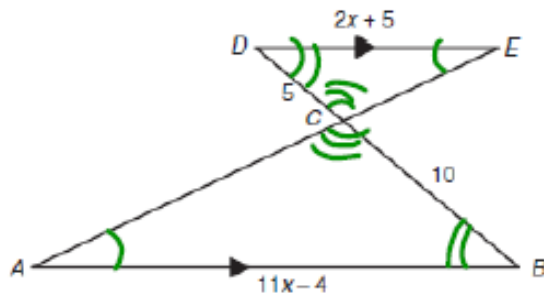
$\frac{5}{10} = \frac{7}{14}$

SAS ~

## FROM LAST CLASS - NOT IN YOUR BOOK, WRITE IN NOTES

A3

4. In the figure shown, segments  $AB$  and  $DE$  are parallel. The length of segment  $BC$  is 10 units and the length of segment  $CD$  is 5 units. Use this information to calculate the value of  $x$ . Explain how you determined your answer.



$$\frac{2x+5}{11x-4} = \frac{5}{10}$$

Corresponding sides:

DC  $\propto$  BCDE  $\propto$  BAEC  $\propto$  AC

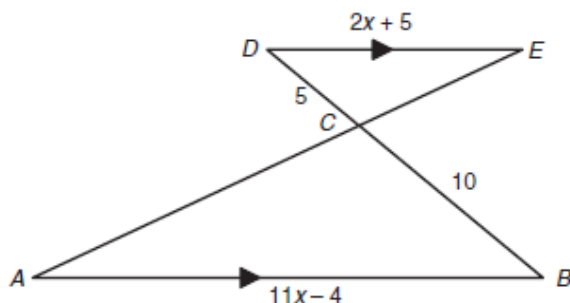
Corresponding angles:

 $\angle A \propto \angle E$  $\angle B \propto \angle D$  $\angle DCE \propto \angle ACB$ 

A5-skip

B3

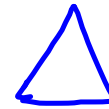
4. In the figure shown, segments  $AB$  and  $DE$  are parallel. The length of segment  $BC$  is 10 units and the length of segment  $CD$  is 5 units. Use this information to calculate the value of  $x$ . Explain how you determined your answer.



4.3

Keep It in Proportion  
Theorems About Proportionality

PG.286 IN YOUR BOOK



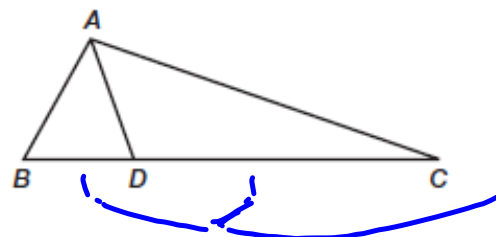
When an interior angle of a triangle is bisected, you can observe proportional relationships among the sides of the triangles formed. You will be able to prove that these relationships apply to all triangles.

The Angle Bisector/Proportional Side Theorem states: "A bisector of an angle in a triangle divides the opposite side into two segments whose lengths are in the same ratio as the lengths of the sides adjacent to the angle."

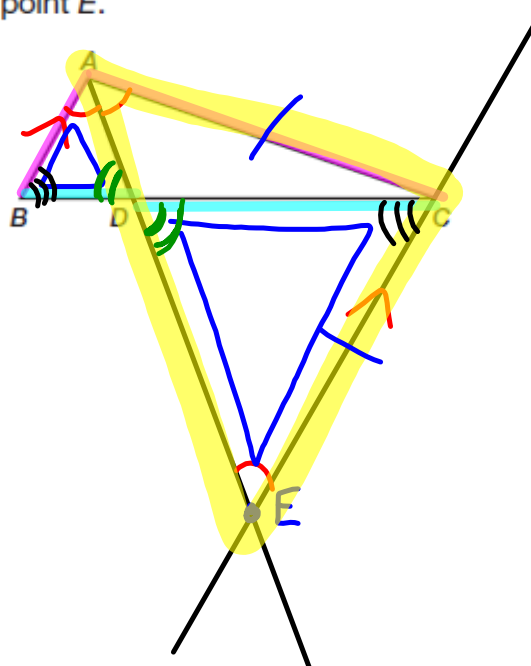
To prove the Angle Bisector/Proportional Side Theorem, consider the statements and figure shown.

Given:  $\overline{AD}$  bisects  $\angle BAC$

Prove:  $\frac{AB}{AC} = \frac{BD}{CD}$



1. Draw a line parallel to  $\overline{AB}$  through point C. Extend  $\overline{AD}$  until it intersects the line. Label the point of intersection, point E.



= vertical angle

## PG.287 IN YOUR BOOK

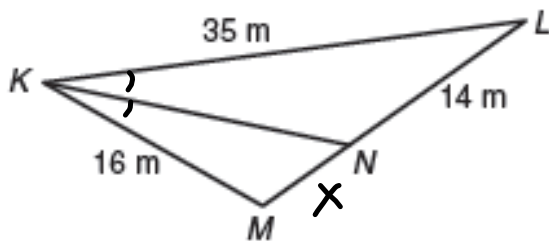
2. Complete the proof of the Angle Bisector/Proportional Side Theorem.

Statements	Reasons
1. $\overline{AD}$ bisects $\angle BAC$	1. Given
2. $\overline{EC} \parallel \overline{AB}$	2. Construction
3. $\angle BAE \cong \angle EAC$	3. Definition of angle bisector
4. $\angle BAE \cong \angle CEA$	4. Alternate Interior $\angle$ Theorem
5. $\angle EAC \cong \angle CEA$	5. Transitive Property of $\cong$
6. $\overline{AC} \cong \overline{CE}$	6. If two angles of a triangle are congruent, then the sides opposite the angles are congruent.
7. $AC = CE$	7. Definition of congruent segments
8. $\angle BCE \cong \angle ABC$	8. Alternate Interior Angle Theorem
9. $\triangle DAB \sim \triangle DEC$	9. AA $\sim$
10. $\frac{AB}{EC} = \frac{BD}{CD}$	10. Corresponding parts of $\sim \triangle$ are proportional.
11. $\frac{AB}{BD} = \frac{EC}{CD}$	11. Rewrite as an equivalent proportion
12. $\frac{AB}{BD} = \frac{AC}{CD}$	12. Substitution Property

NOT IN YOUR BOOK, BUT LIKE PROBLEMS ON PAGES 288-290

Calculate the indicated length in each figure.

1.  $\overline{KN}$  bisects  $\angle K$ . Calculate  $MN$ .

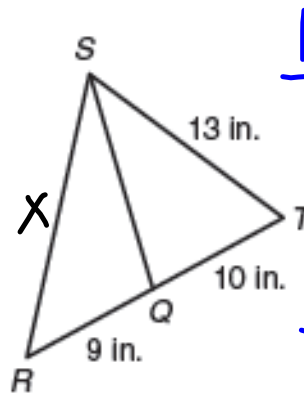


$$\frac{14}{35} \neq \frac{x}{16}$$

$$\frac{35x}{35} = \frac{14 \cdot 16}{35}$$

$$x =$$

2.  $\overline{SQ}$  bisects  $\angle S$ . Calculate  $SR$ .

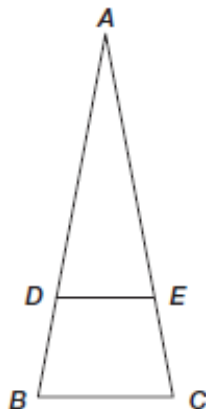


$$\frac{13}{10} = \frac{x}{9}$$

$$\frac{9}{10} = \frac{x}{13}$$

## PG.291 IN YOUR BOOK

The **Triangle Proportionality Theorem** states: "If a line parallel to one side of a triangle intersects the other two sides, then it divides the two sides proportionally."



Given:  $\overline{BC} \parallel \overline{DE}$

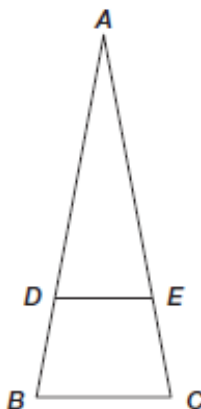
Prove:  $\frac{BD}{DA} = \frac{CE}{EA}$

- ~~1. Write a paragraph proof to prove triangle ADE is similar to triangle ABC.~~

**SKIP**

## PG.296 IN YOUR BOOK

The **Converse of the Triangle Proportionality Theorem** states: "If a line divides two sides of a triangle proportionally, then it is parallel to the third side."



Given:  $\frac{BD}{DA} = \frac{CE}{EA}$

Prove:  $\overline{BC} \parallel \overline{DE}$

- ~~Prove the Converse of the Triangle Proportionality Theorem.~~

**SKIP**

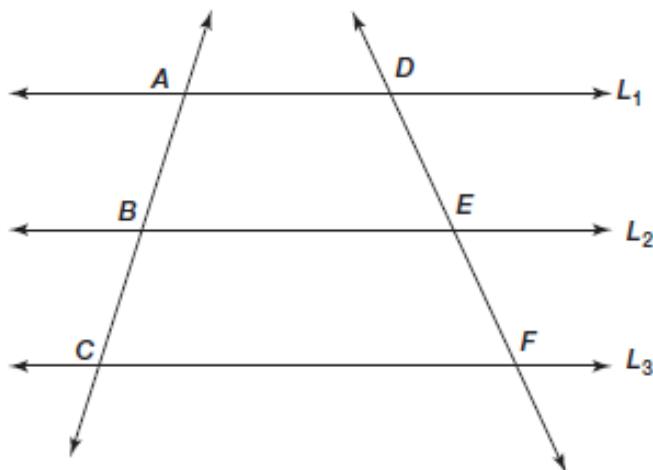


## PG.297 IN YOUR BOOK

The **Proportional Segments Theorem** states: "If three parallel lines intersect two transversals, then they divide the transversals proportionally."

Given:  $L_1 \parallel L_2 \parallel L_3$

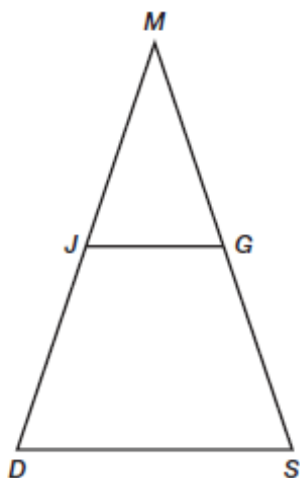
Prove:  $\frac{AB}{BC} = \frac{DE}{EF}$



## PG.298 IN YOUR BOOK

The **Triangle Midsegment Theorem** states: "The midsegment of a triangle is parallel to the third side of the triangle and is half the measure of the third side of the triangle."

1. Use the diagram to write the "Given" and "Prove" statements for the Triangle Midsegment Theorem.



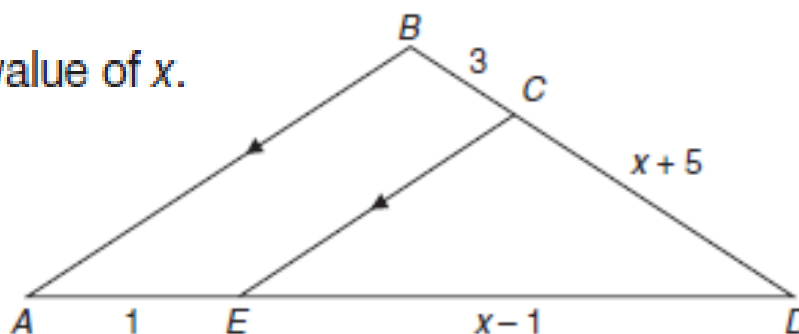
Given:

Prove:

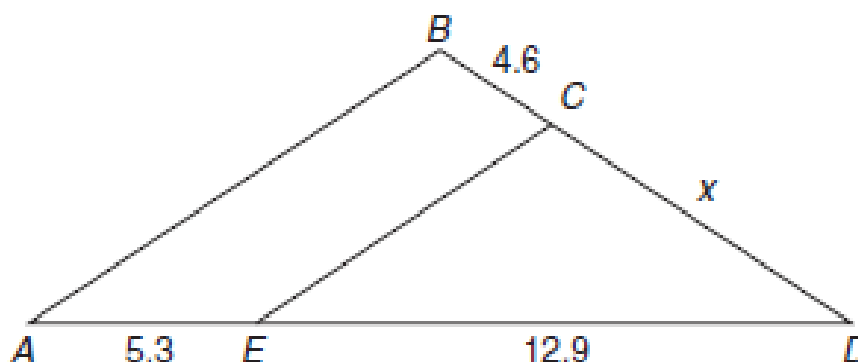
NOT IN YOUR BOOK, WRITE IN NOTES

Given:  $\overline{AB} \parallel \overline{CE}$

Calculate the value of  $x$ .

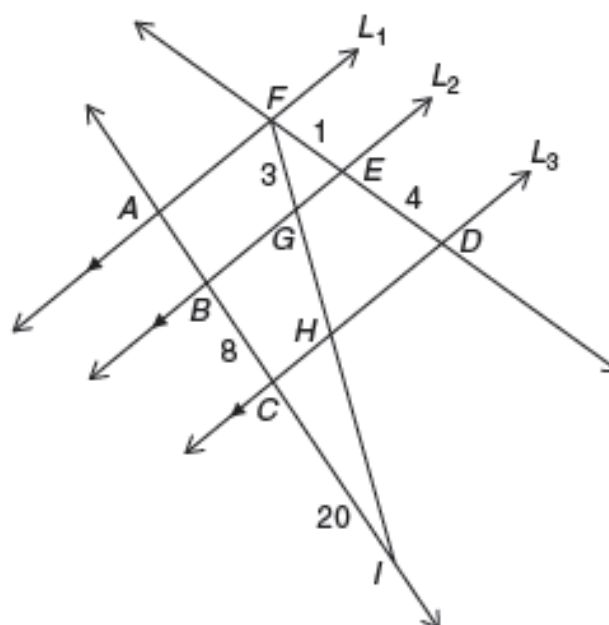


Calculate a value for  $x$  such that  $\overline{AB} \parallel \overline{CE}$ .



Given:  $L_1 \parallel L_2 \parallel L_3$

Calculate  $HI$ .



# Homework

## Finish 4.3