

Geometry 7.4

Use proportional parts within triangles

Use proportional parts with parallel lines

triangle midsegment

trapezoid midsegment

parallel

transversal

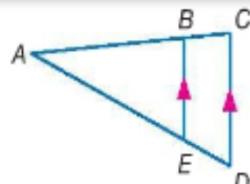
midsegment

proportion

Theorem 7.5 Triangle Proportionality Theorem

If a line is parallel to one side of a triangle and intersects the other two sides, then it divides the sides into segments of proportional lengths.

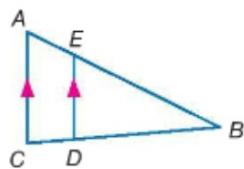
Example If $\overline{BE} \parallel \overline{CD}$, then $\frac{AB}{BC} = \frac{AE}{ED}$.



Theorem 7.6 Converse of Triangle Proportionality Theorem

If a line intersects two sides of a triangle and separates the sides into proportional corresponding segments, then the line is parallel to the third side of the triangle.

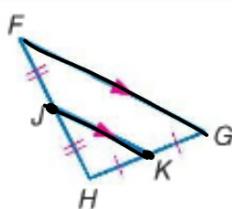
Example If $\frac{AE}{EB} = \frac{CD}{DB}$, then $\overline{AC} \parallel \overline{ED}$.



Theorem 7.7 Triangle Midsegment Theorem

A midsegment of a triangle is parallel to one side of the triangle, and its length is one half the length of that side.

Example If J and K are midpoints of \overline{FH} and \overline{HG} , respectively, then $\overline{JK} \parallel \overline{FG}$ and $JK = \frac{1}{2}FG$.



You will prove Theorem 7.7 in Exercise 32.

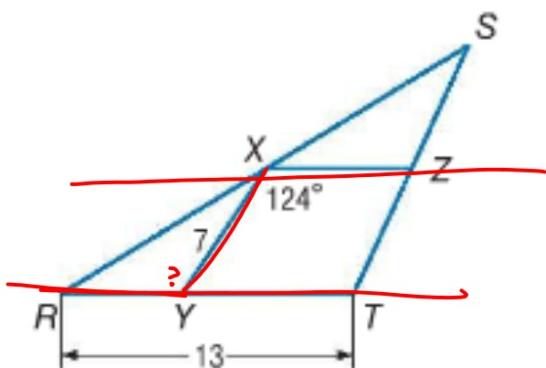
Example 3 Use the Triangle Midsegment Theorem

In the figure, \overline{XY} and \overline{XZ} are midsegments of $\triangle RST$. Find each measure.

a. $XZ = 6.5$

b. $ST = 14$

c. $m\angle RYX = 124^\circ$



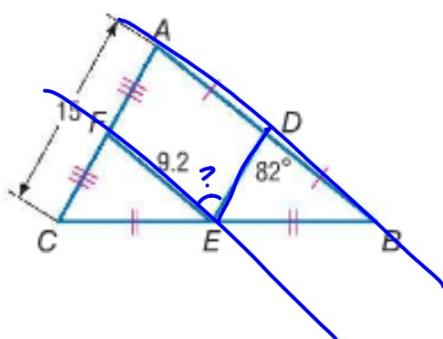
Guided Practice

Find each measure.

3A. $DE = 7.5$

3B. $DB = 9.2$

3C. $m\angle FED = 82^\circ$

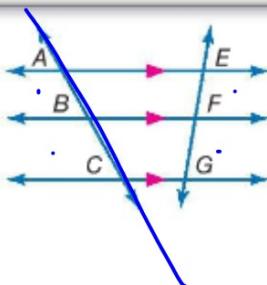


extend the
transversals...

Corollary 7.1 Proportional Parts of Parallel Lines

If three or more parallel lines intersect two transversals, then they cut off the transversals proportionally.

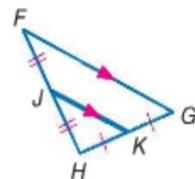
Example If $\overline{AE} \parallel \overline{BF} \parallel \overline{CG}$, then $\frac{AB}{BC} = \frac{EF}{FG}$.



Theorem 7.7 Triangle Midsegment Theorem

A midsegment of a triangle is parallel to one side of the triangle, and its length is one half the length of that side.

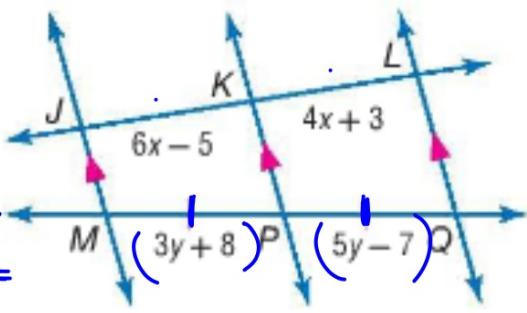
Example If J and K are midpoints of \overline{FH} and \overline{HG} , respectively, then $\overline{JK} \parallel \overline{FG}$ and $JK = \frac{1}{2}FG$.



You will prove Theorem 7.7 in Exercise 32.

 **Real-World Example 5** Use Congruent Segments

ALGEBRA Find x and y .

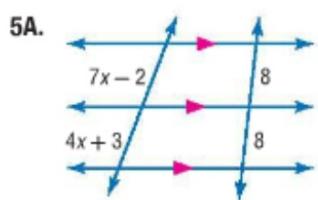


$$\frac{(6x-5)}{(4x+3)} = \frac{30.5}{30.5}$$

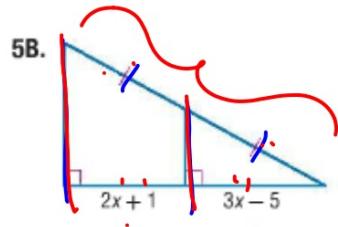
$$30.5(6x-5) = 30.5(4x+3) \quad \begin{array}{r} 3y+8 = 5y-7 \\ -3y + 7 \quad -3y + 7 \\ \hline 15 = 2y \end{array}$$

$$7.5 = y$$

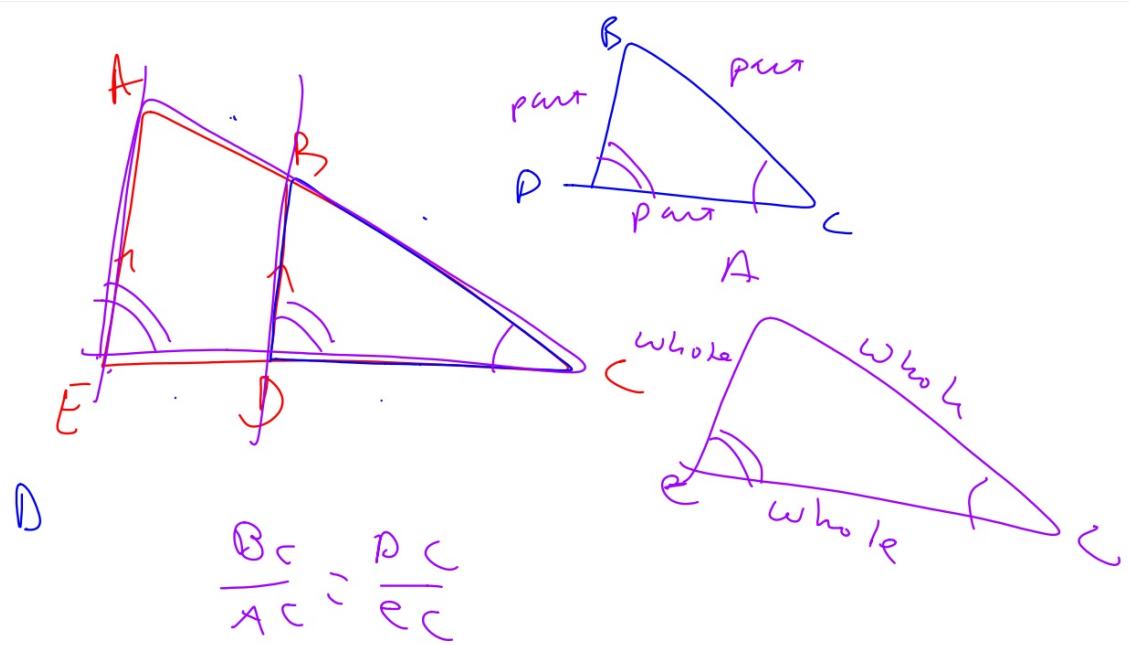
Guided Practice



$$\frac{7x-2}{4x+3} = \frac{8}{8}$$



$$2x+1 = 3x-5$$



$$\frac{BC}{AC} = \frac{DC}{EC}$$

WB 7, 4

skills 1-10
prac. 1-9