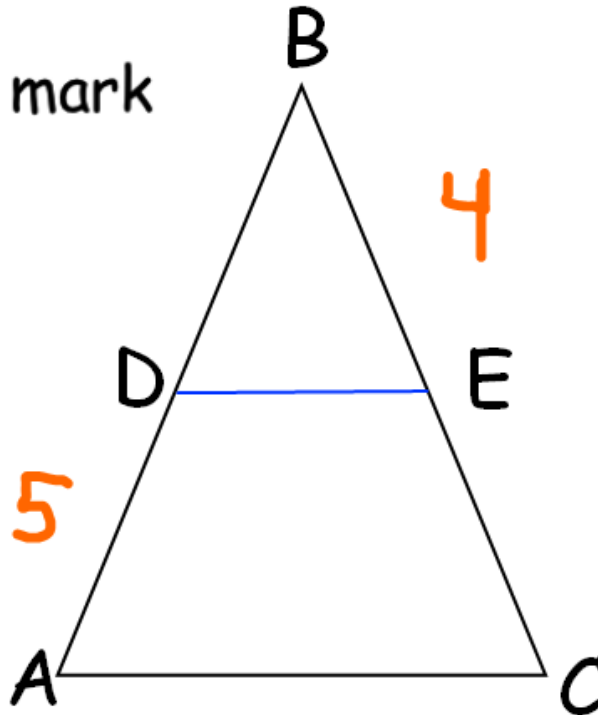


6.6 Use Proportionality Theorems

Goal • Use proportions with a triangle or parallel lines.

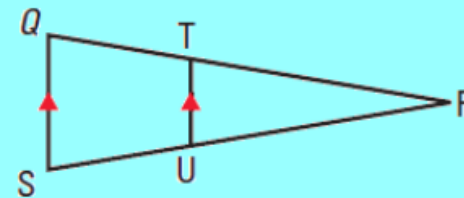
If \overline{DE} is the midsegment, mark what we know.



*The Midsegment Theorem, which we learned on p. 295, is a special case of the Triangle Proportionality Theorem and its converse.

THEOREMS*For Your Notebook***THEOREM 6.4 Triangle Proportionality Theorem**

If a line parallel to one side of a triangle intersects the other two sides, then it divides the two sides proportionally.

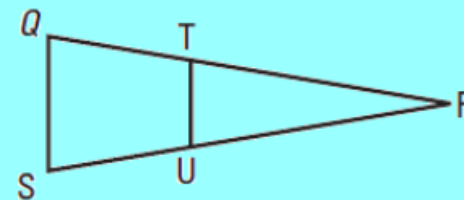


If $\overline{TU} \parallel \overline{QS}$, then $\frac{RT}{TQ} = \frac{RU}{US}$.

Proof: Ex. 22, p. 402

THEOREM 6.5 Converse of the Triangle Proportionality Theorem

If a line divides two sides of a triangle proportionally, then it is parallel to the third side.

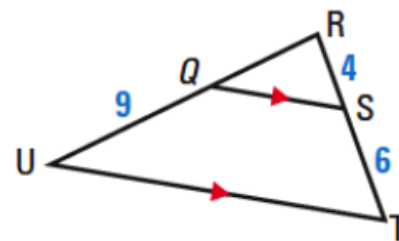


If $\frac{RT}{TQ} = \frac{RU}{US}$, then $\overline{TU} \parallel \overline{QS}$.

Proof: Ex. 26, p. 402

EXAMPLE 1 Find the length of a segment

In the diagram, $\overline{QS} \parallel \overline{UT}$, $RS = 4$, $ST = 6$, and $QU = 9$. What is the length of \overline{RQ} ?



EXAMPLE 2 Solve a real-world problem

SHOERACK On the shoerack shown, $AB = 33$ cm, $BC = 27$ cm, $CD = 44$ cm, and $DE = 25$ cm. Explain why the gray shelf is not parallel to the floor.



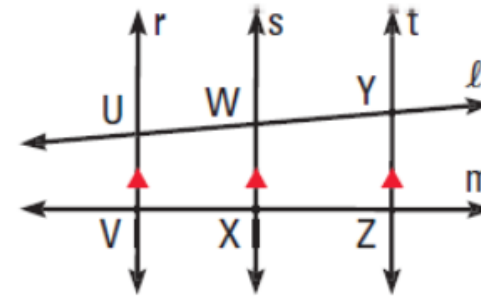
THEOREMS

For Your Notebook

THEOREM 6.6

If three parallel lines intersect two transversals, then they divide the transversals proportionally.

Proof: Ex. 23, p. 402

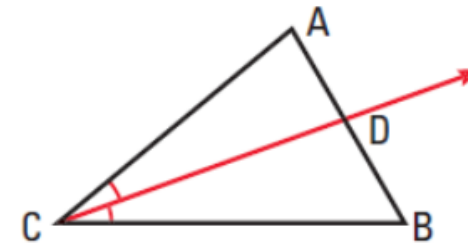


$$\frac{UW}{WY} = \frac{VX}{XZ}$$

THEOREM 6.7

If a ray bisects an angle of a triangle, then it divides the opposite side into segments whose lengths are proportional to the lengths of the other two sides.

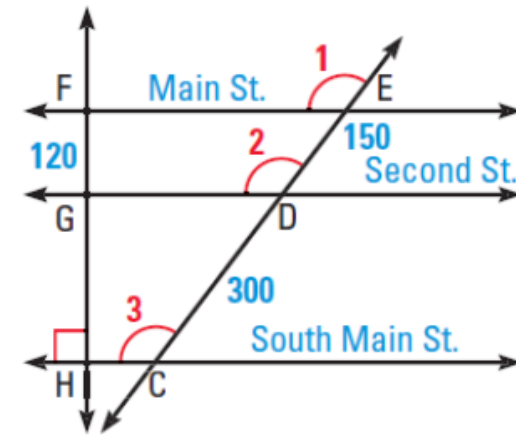
Proof: Ex. 27, p. 403



$$\frac{AD}{DB} = \frac{CA}{CB}$$

EXAMPLE 3 Use Theorem 6.6

CITY TRAVEL In the diagram, $\angle 1$, $\angle 2$, and $\angle 3$ are all congruent and $GF = 120$ yards, $DE = 150$ yards, and $CD = 300$ yards. Find the distance HF between Main Street and South Main Street.

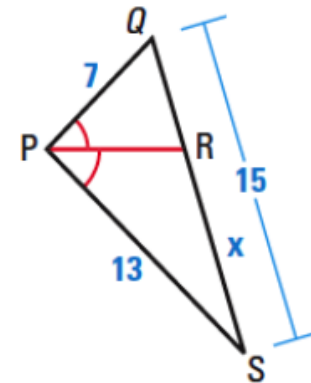


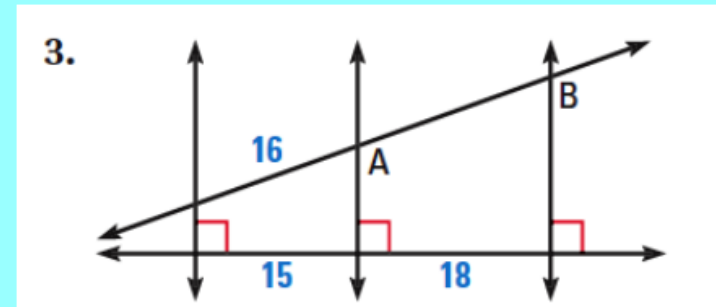
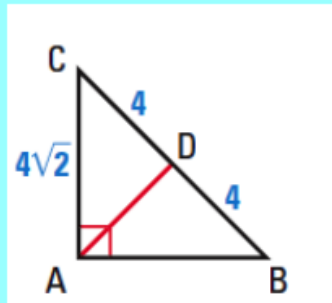
ANOTHER WAY

For alternative methods for solving the problem in Example 3, turn to page 404 for the **Problem Solving Workshop**.

EXAMPLE 4 Use Theorem 6.7

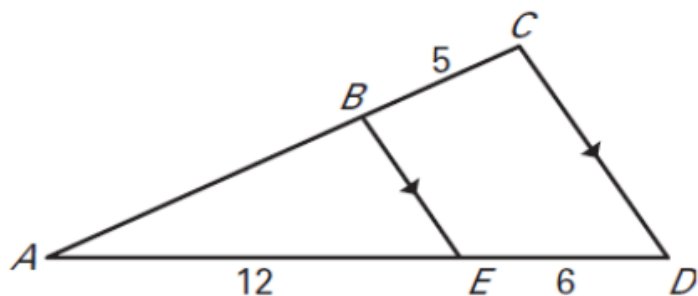
In the diagram, $\angle QPR \cong \angle RPS$. Use the given side lengths to find the length of \overline{RS} .



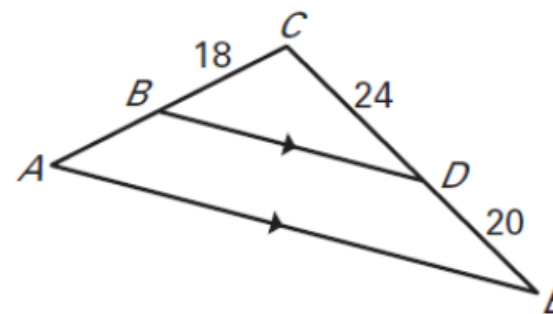


Find the length of \overline{AB} .

1.



2.



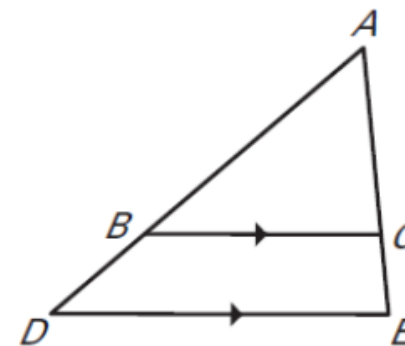
Determine whether the statement is *true* or *false*. Explain your reasoning.

3. $\frac{AB}{BD} = \frac{AC}{CE}$

4. $\frac{AC}{CE} = \frac{BC}{DE}$

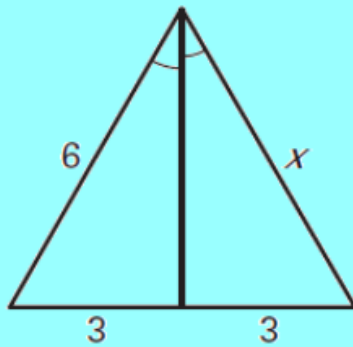
5. $\frac{EC}{CA} = \frac{ED}{CB}$

6. $\frac{DB}{BA} = \frac{EC}{CA}$

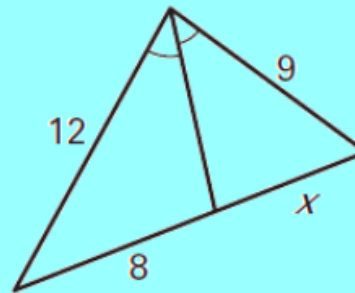


Find the value of x .

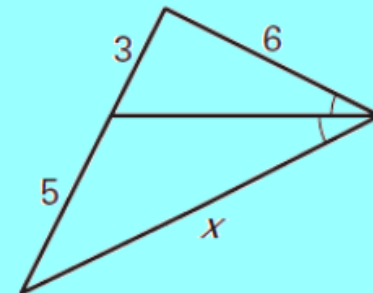
15.



16.

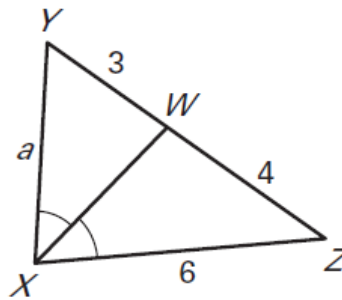


17.

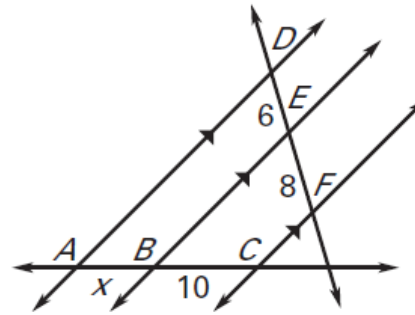


Find the value of the variable.

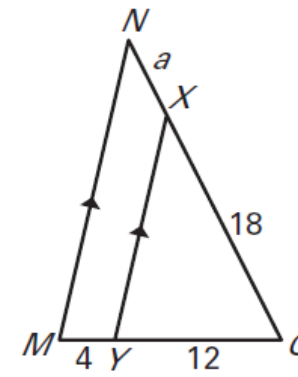
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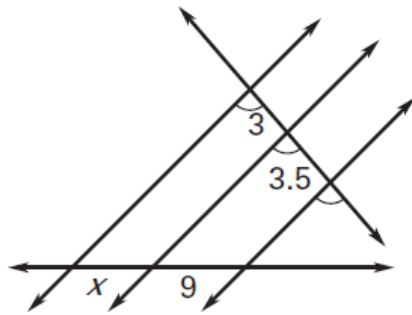
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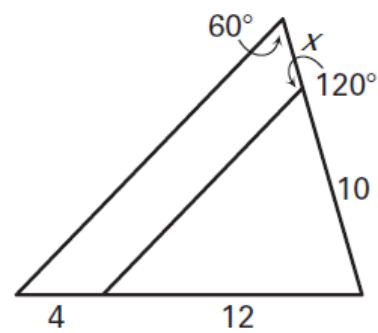
20.



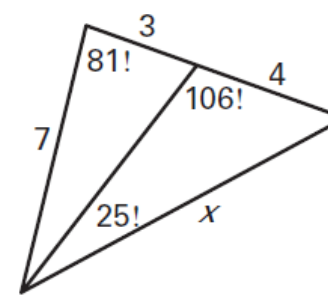
21.



22.



23.



Day 2 Assignment:
p. 400 (3-17, 21, 30-
36)