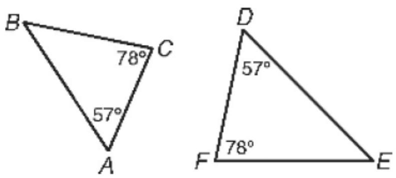
Name: ________________________ Block: __

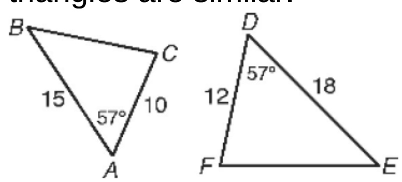
3 Ways to Prove Triangles are Similar

AA~ Postulate:
If two angles of one triangle are congruent to two angles of another, then the triangles are similar.



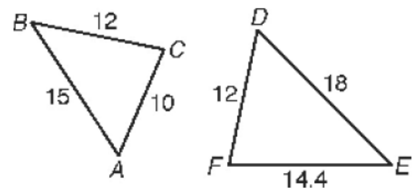
△ABC ~ △DEF

SAS~ Postulate:
If one angle of one triangle is congruent to the one angle of another triangle and the adjacent sides are proportional, then the triangles are similar.



△ABC ~ △DEF

SSS~ Postulate:
If all three sides of one triangle are proportional to corresponding sides of another triangle, then the triangles are similar.

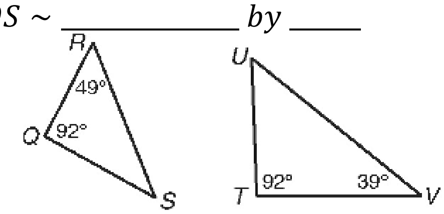


△ABC ~ △DEF

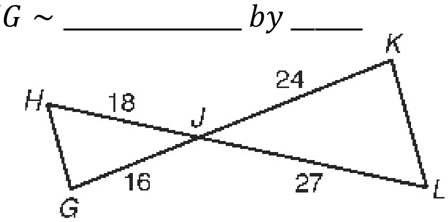
You can mark vertical angles and shared angles congruent!

Explain why the triangles are similar (SSS~, SAS~, or AA~) and write a similarity statement.

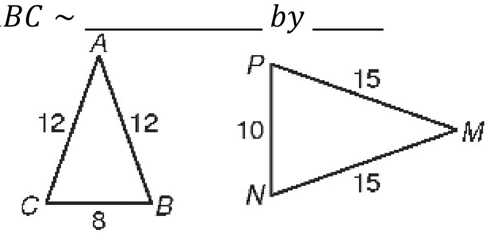
1. $\Delta RQS \sim$ ____________ by _____



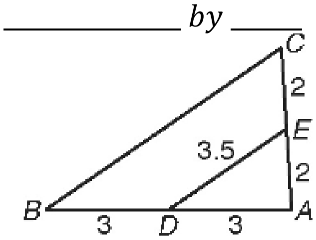
2. $\Delta HJG \sim$ ____________ by _____



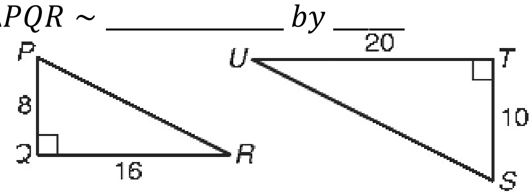
3. $\Delta ABC \sim$ ____________ by _____



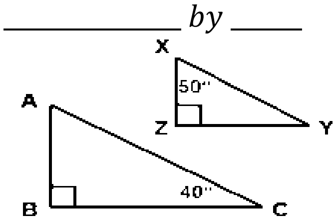
4. $\Delta AED \sim$ ____________ by _____



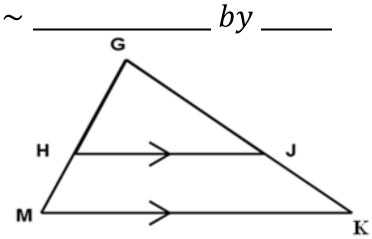
5. $\Delta PQR \sim$ ____________ by _____



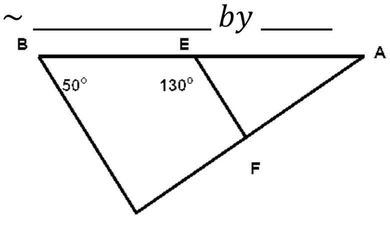
6. $\Delta XYZ \sim$ ____________ by _____



7. $\Delta GMK \sim$ ____________ by _____

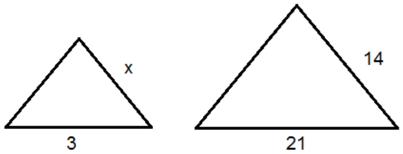


8. $\Delta ABC \sim$ ____________ by _____

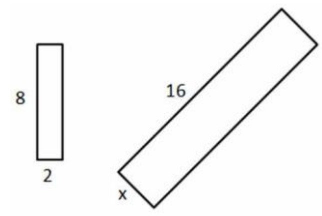


Solve for the missing lengths of the similar figures.

9.



10.



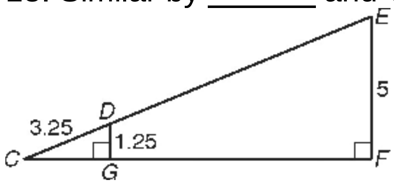
Similar Triangle Word Problems.

11. A tree 24 feet tall casts a shadow 12 feet long. Brad is 6 feet tall. How long is Brad's shadow?

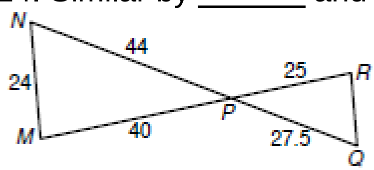
12. A 40-foot flagpole casts a 25-foot shadow. Find the height of a building that casts a 125-foot shadow.

Explain why the triangles are similar (SSS~, SAS~, or AA~) and find each length

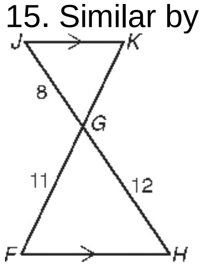
13. Similar by ______ and CE = ______



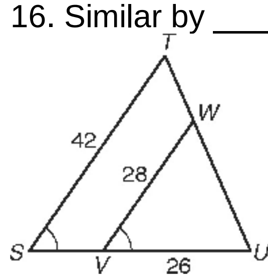
14. Similar by ______ and RQ = ______



15. Similar by ______ and GK = ______

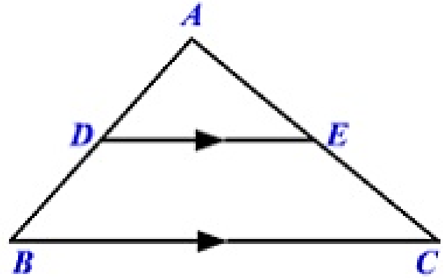


16. Similar by ______ and SV = ______



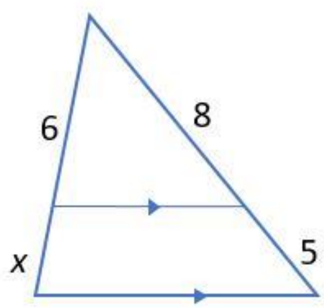
Triangle Proportionality Theorem

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

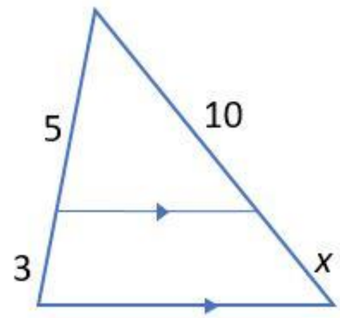


$\overline{DE} \parallel \overline{BC}$ *therefore* $\frac{AD}{DB} = \frac{AE}{EC}$

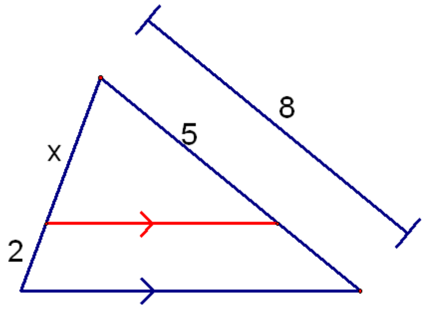
Ex.1 Solve for x.



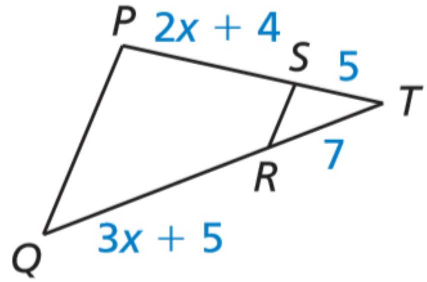
Ex.2 Solve for x.



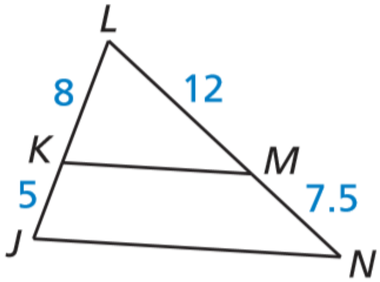
Ex.3 Solve for x.



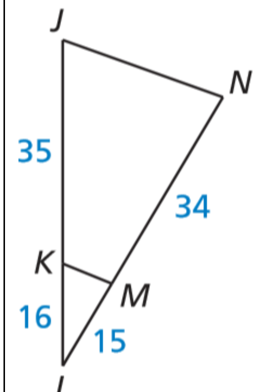
Ex.4 Find the value of x if SR is parallel to PQ.



Ex.5 Determine whether $\overline{KM} \parallel \overline{JN}$.



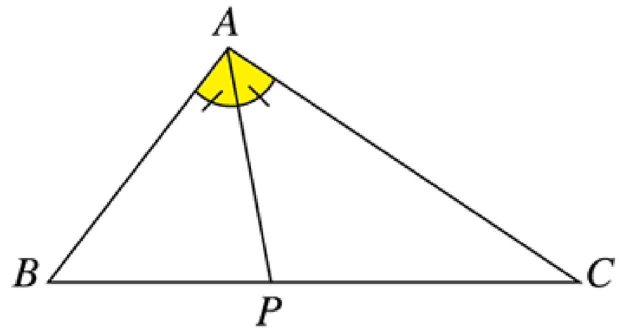
Ex.6 Determine whether $\overline{KM} \parallel \overline{JN}$.



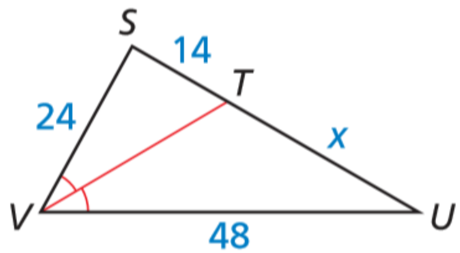
Triangle Bisector Theorem

Triangle Bisector Theorem- if one angle of a triangle is bisected, or cut in half, then the angle bisector of the triangle divides the opposite side of the triangle into two segments that are proportional to the other two sides of the triangle.

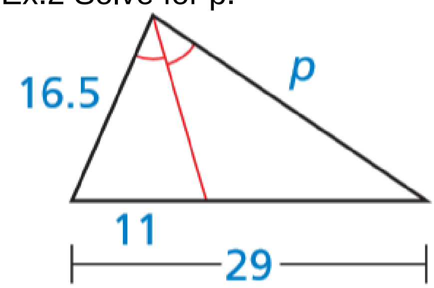
$$\frac{CA}{CP} = \frac{BA}{BP}$$



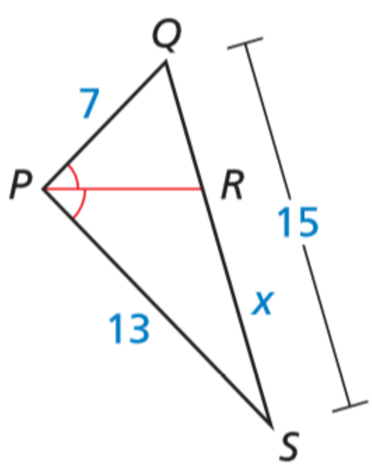
Ex.1 Solve for x.



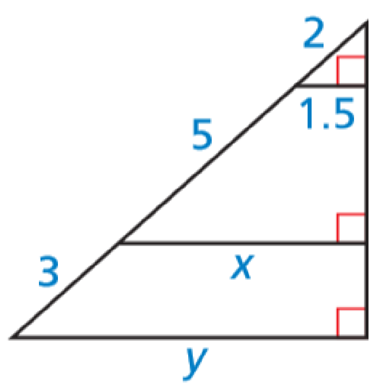
Ex.2 Solve for p.



Ex.3 Solve for x.

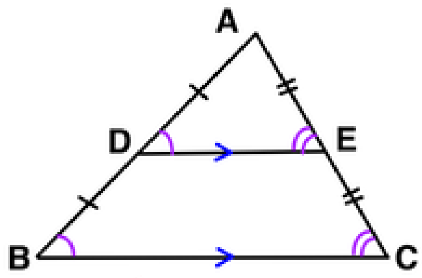


Ex.4 Traingle Proportionality Theorem. Find x and y.



Midsegments

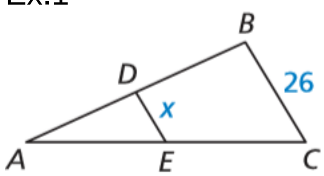
Triangle Midsegment Theorem – If a segment joins the midpoints of two sides of a triangle, then the segment is parallel to the 3rd side and half its length.



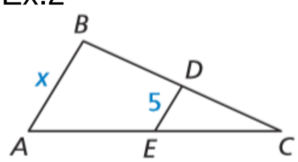
$$\overline{DE} = \frac{1}{2}\overline{BC} \text{ or } BC = 2 \cdot \overline{DE}$$

DE is a midsegment of △ABC. Find the value of x.

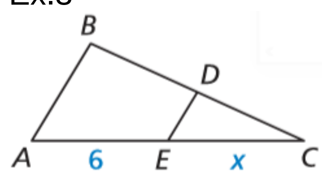
Ex.1



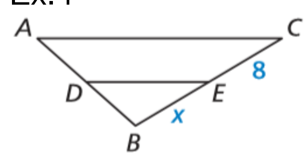
Ex.2



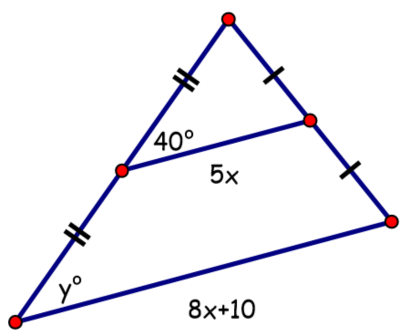
Ex.3



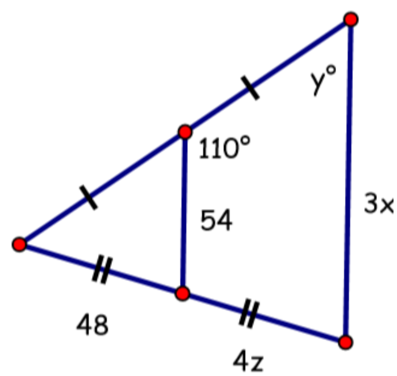
Ex.4



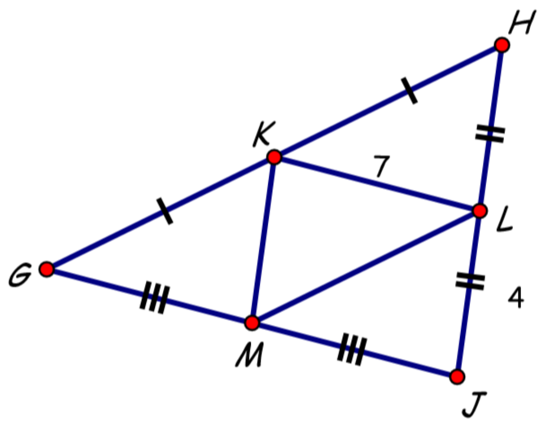
Ex.5 Solve for x.



Ex.6 Solve for x.



Ex.7 $\overline{GH} = 12$



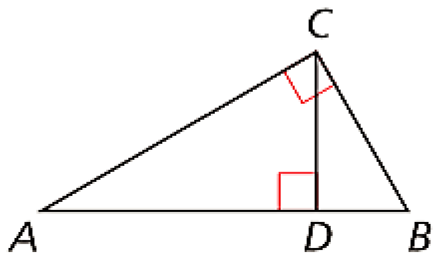
What is the perimeter of ΔGHJ?

What is the perimeter of ΔKLM?

What is the relationship between the perimeter of ΔGHJ and the perimeter of ΔKLM?

Right Triangle Similarity Theorem

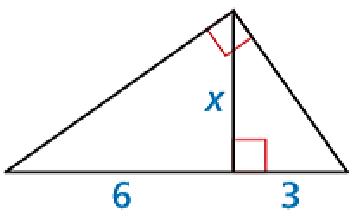
- If the altitude is drawn to the hypotenuse of a right triangle, then the two triangles formed are similar to the original triangle and to each other.
- Geometric Mean (Altitude) Theorem -In a right triangle, the altitude from the right angle to the hypotenuse divides the hypotenuse into two segments. The length of the altitude is the geometric mean of the lengths of the two segments of the hypotenuse.



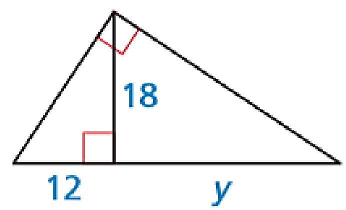
$\Delta CBD \sim \Delta ABC$
$\Delta ACD \sim \Delta ABC$
and
$\Delta CBD \sim \Delta ACD$

$CD^2 = AD \cdot BD$

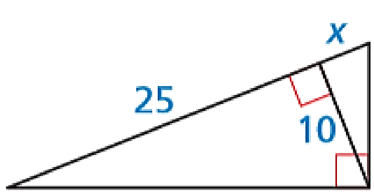
Ex.1



Ex.2



Ex.4



Ex.4