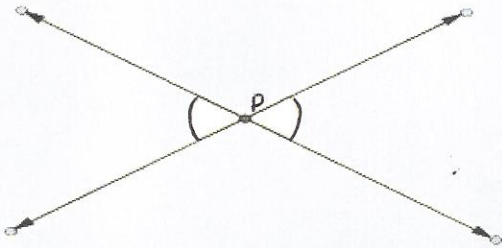
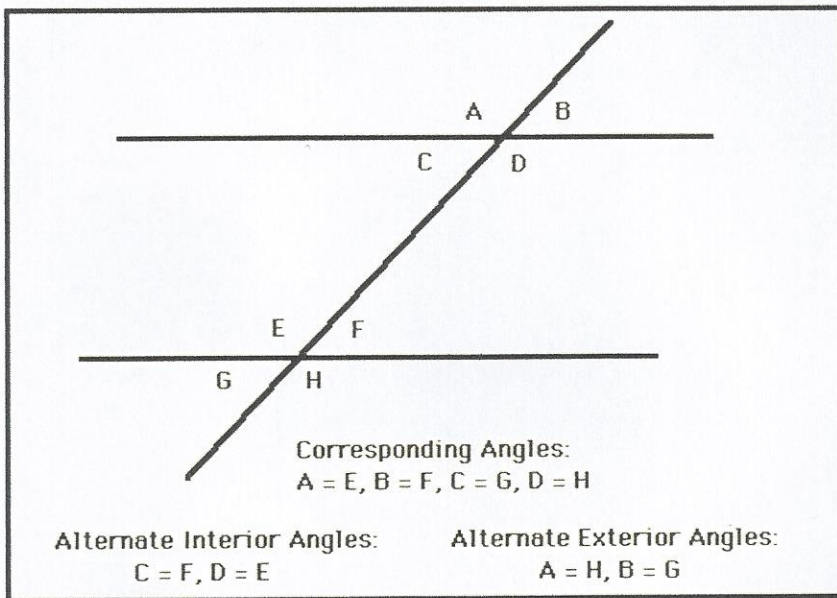


Math III Proving Geometric Theorems Review

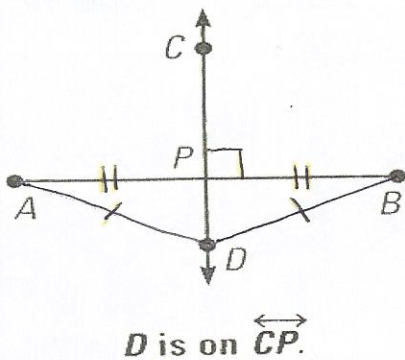
Vertical Angles – When two lines intersect, the angles across from each other are vertical angles and are congruent



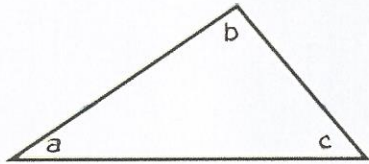
Parallel lines cut by a transversal produce congruent alternate interior and corresponding angles.



Perpendicular bisector – Points on a perpendicular bisector of a line segment are exactly those equidistant from the segment's endpoints

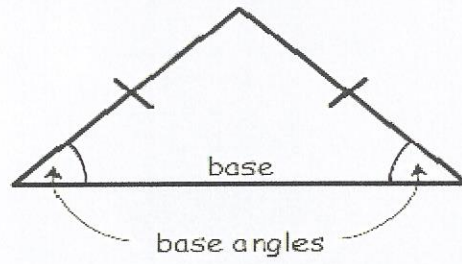


Interior angles of a triangle add up to 180°

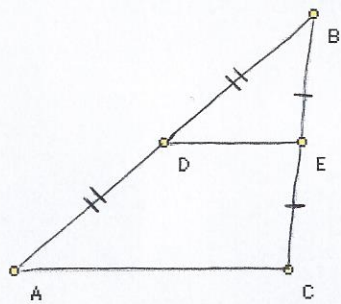


$$a + b + c = 180 \text{ degrees}$$

Isosceles Triangle – base angles are congruent

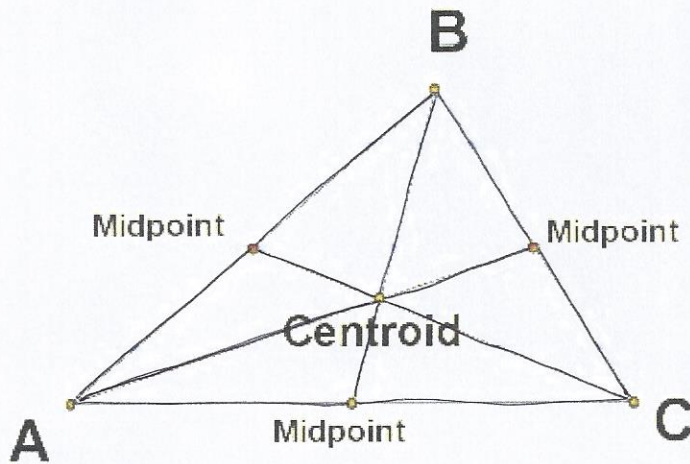


Triangle mid-segment theorem



\overline{DE} is parallel to \overline{AC} .
 \overline{DE} is also half the length of \overline{AC} .

Centroid – where the medians of a triangle meet



The vertex to the centroid is $\frac{2}{3}$ the length of the whole segment

Parallelograms

Properties

- Opposite sides are parallel
- Opposite angles are congruent
- Opposite sides are congruent
- Diagonals bisect each other

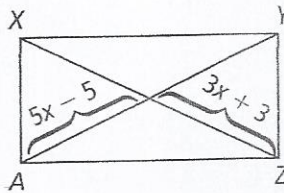
Rectangles

A rectangle is a type of parallelogram and it holds all the properties of a parallelogram but adds...

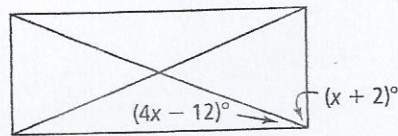
- 4 right angles
- Diagonals are congruent

1. Which of the following conditions or set of conditions must be met for a parallelogram to be a rectangle?
A. Diagonals are perpendicular
B. Diagonals are congruent
C. All sides are congruent
D. The length of a diagonal is equal to the length of a side

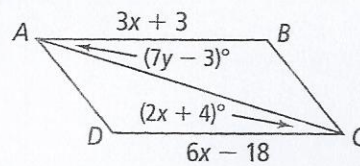
2. For what value of x is $XYZA$ a rectangle?
A. 2
B. 3
C. 4
D. 5



3. What is the value of x for the rectangle?



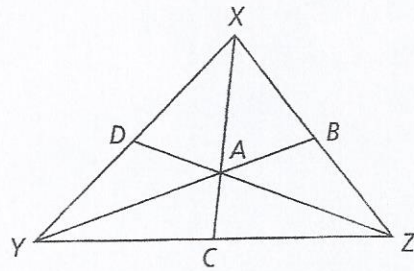
4. What is the value of x and y for the parallelogram?



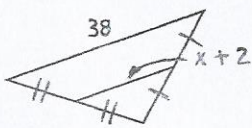
5. In $\triangle XYZ$, A is the centroid.

A. If $DZ=12$, find ZA and AD .

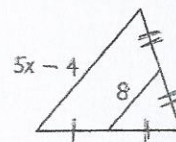
B. If ZB is 5, what other segment length can you prove? Explain how you can prove the length.



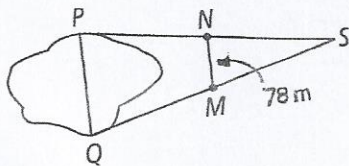
6. Find the value of x



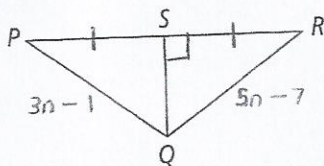
7. Find the value of x



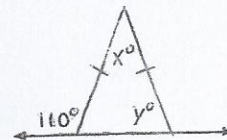
8. A surveyor needs to measure the distance PQ across the lake. Beginning at point S , she locates the midpoints, of \overline{SQ} and \overline{SP} at M and N . She then measures \overline{NM} . What is PQ ?



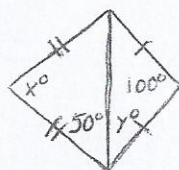
9. What is the length of \overline{QR} ?



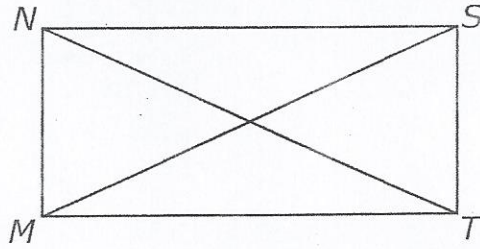
10. Solve for x and y .



11. Solve for x and y .



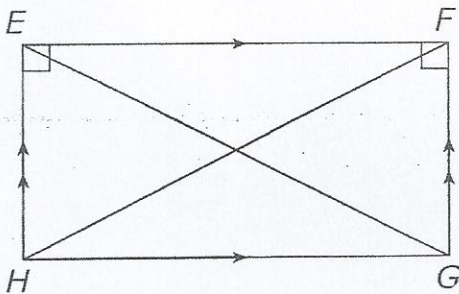
12. In the figure below, $NSTM$ is a rectangle and $m\angle SMN = 65$.



What is $m\angle NTM$?

- A. 12.5 B. 25 C. 50 D. 65

13. Given:



$$FG = 2x + 4$$

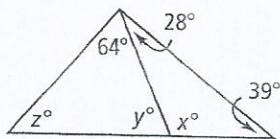
$$EG = 3x + 9$$

$$FH = 7x - 3$$

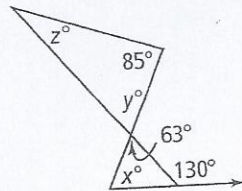
What is the length of \overline{EH} ?

- A. 18 B. 10 C. 9 D. 5

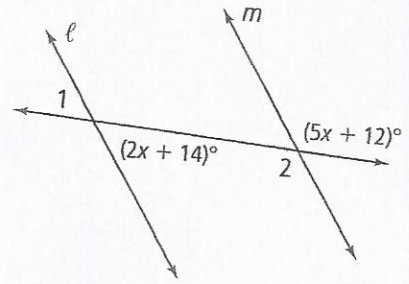
14. Find x , y , and z .



15. Find x , y , and z .

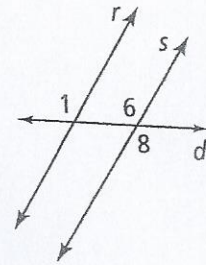


16. Use the figure at the right. If $l \parallel m$, what is the $m < 1$?
 A. 22 B. 58 C. 122 D. 130



17. Using the figure at the right, prove $\angle 1 \cong \angle 8$

Given: $r \parallel s$
 Prove: $\angle 1 \cong \angle 8$



18. Using the rectangle below, prove $\triangle ABE \cong \triangle CDE$.

