

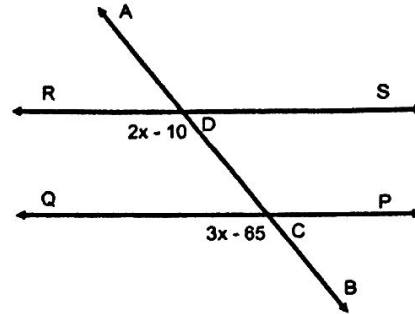
Name: Key
 End of Module 1 Assessment Review

Date: _____
 CC Geometry

1. In the accompanying diagram, AB intersects PQ and RS at C and D, respectively. If PQ is parallel to RS, $m\angle RDB = 2x - 10$, and $m\angle QCA = 3x - 65$, find x.

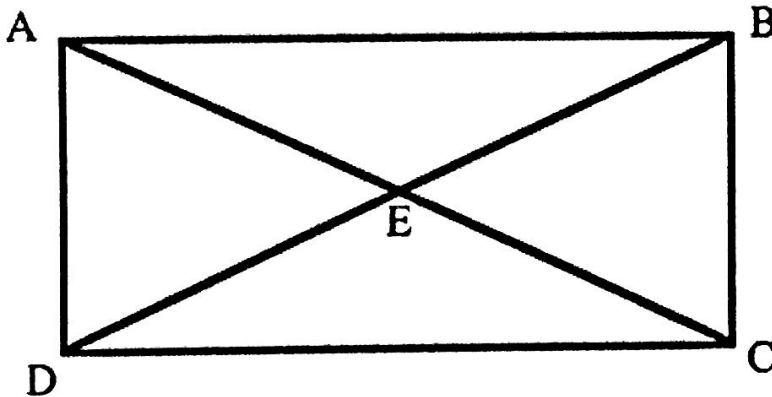
$$2x - 10 = 3x - 65$$

$$\boxed{x = 55}$$



2. The diagram below is of rectangle ABCD. Diagonals BD and AC intersect at E.

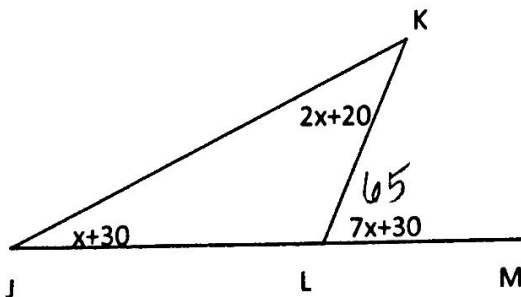
- a) If $AE = 4x + 10$ and $EC = 2x + 32$, find x.
 b) If $AC = 6w - 18$ and $BD = 3w + 3$, find the length of BD.



a) $4x + 10 = 2x + 32$
 $2x = 22$
 $\boxed{x = 11}$

b) $6w - 18 = 3w + 3$
 $3w = 21$
 $w = 7$ $\boxed{BD = 24}$

3. In the diagram below of $\triangle JKL$, JL is extended to M. If $m\angle JKL = 2x + 20$, $m\angle KJL = x + 30$, and $m\angle KLM = 7x + 30$, what is $m\angle KLJ$?



$$x + 30 + 2x + 20 = 7x + 30$$

$$3x + 50 = 7x + 30$$

$$20 = 4x$$

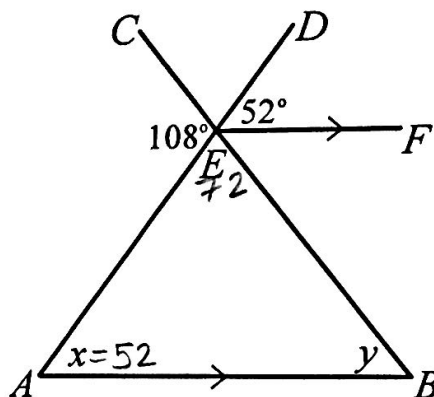
$$x = 5$$

$$\boxed{m\angle KLJ = 115}$$

4. Use any of the assumptions, facts, and/or properties to find x and y in each figure below. Justify your solutions.

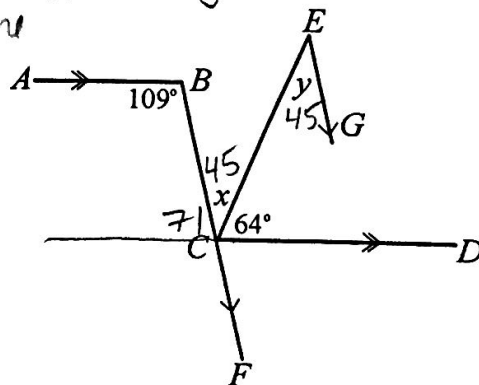
a) $x = \underline{52}$ • corresponding w/ $\angle DEF$

$y = \underline{56}$ • sum of angles in a $\Delta = 180^\circ$
• linear pairs form supplementary angles

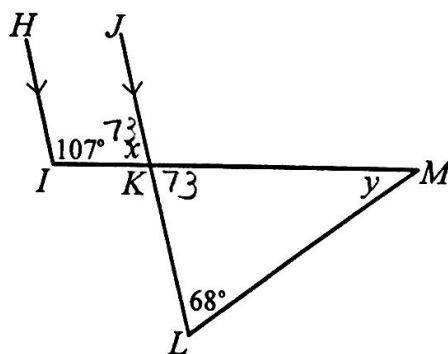


b) You will need to draw an auxiliary line to solve for x and y in this problem.

$x = \underline{45}$ • same side interior angles are supplementary
• consecutive adj angles on a line
 $y = \underline{45}$ • alt interior angles are congruent



c) $x = \underline{73}$ • same side interior angles are supplementary
 $y = \underline{39}$ • vertical angles are congruent
• angles in a Δ sum to 180°



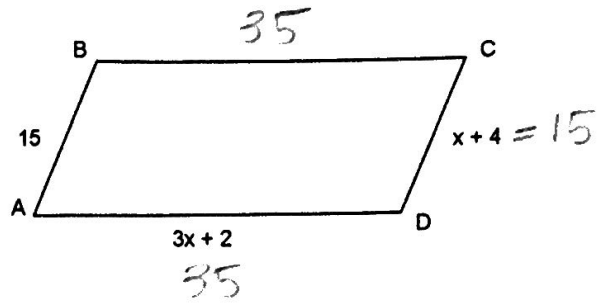
5. Find the perimeter of parallelogram $ABCD$. Justify your solution.

$$x = 11$$

$$\text{Perimeter} = 100$$

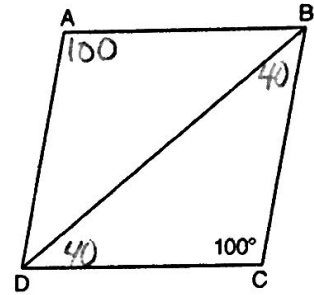
$$15 = x + 4$$

$$11 = x$$

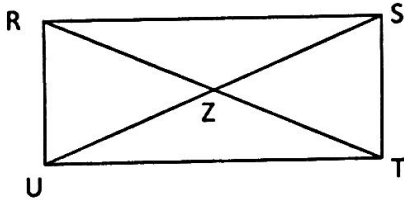


6. In the diagram below of rhombus $ABCD$, $m\angle C = 100^\circ$. What is $m\angle DBC$?

$$\angle DBC = 40$$



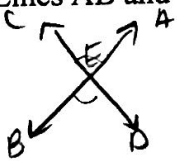
7. If $UZ = x + 21$ and $ZS = 3x - 15$, find US .



$$\begin{aligned} x + 21 &= 3x - 15 \\ 2x &= 36 \\ x &= 18 \end{aligned}$$

$$US = 78$$

8. Lines AB and CD intersect at E . If $\angle AEC = 4x - 8$ and $\angle BED = 5x - 18$, find the measure of angle CEB .



$$\begin{aligned} 4x - 8 &= 5x - 18 \\ x &= 10 \end{aligned}$$

$$\angle CEB = 148$$

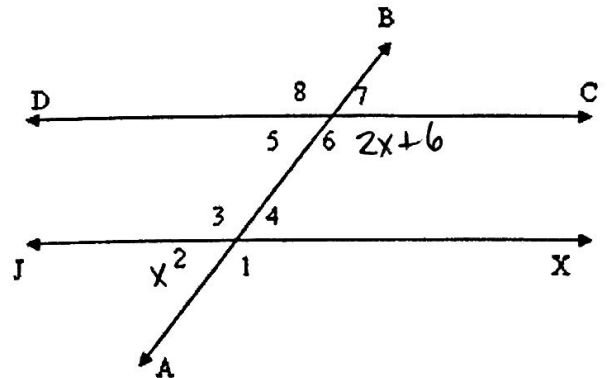
9. Given the diagram below, $\overline{DC} \parallel \overline{JX}$ and \overline{AB} is a transversal. If the measure of angle 6 is 6 more than 2 times the measure of angle 2. Find the measure of angle 3.

$$x + 2x + 6 = 180$$

$$3x = 174$$

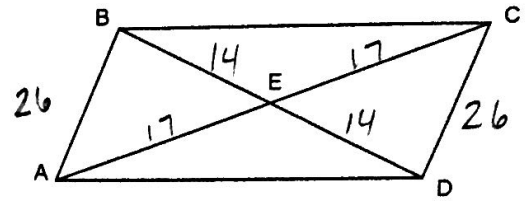
$$x = 58$$

$$\angle 3 = 122$$



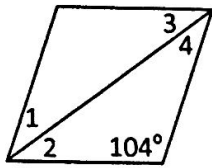
10. Given parallelogram ABCD with AC = 34, AB = 26, and BD = 28, find the perimeter of $\triangle CED$. Justify your solution

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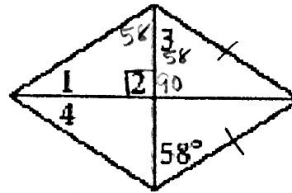
11. Find the measure of the numbered angles in each rhombus:

a)



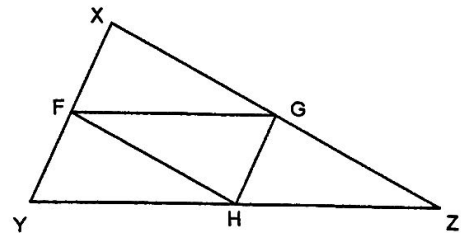
$$\angle 1 = \angle 2 = \angle 3 = \angle 4 = 38^\circ$$

b)



$$\begin{aligned} \angle 1 &= 32 \\ \angle 2 &= 90 \\ \angle 3 &= 58 \\ \angle 4 &= 32 \end{aligned}$$

12. ~~F, G, and H are midpoints of the sides on which they are located. If $XY = 12$, $XZ = 20$, and $ZY = 24$, find the perimeter of $\triangle FGH$. Justify your solution.~~



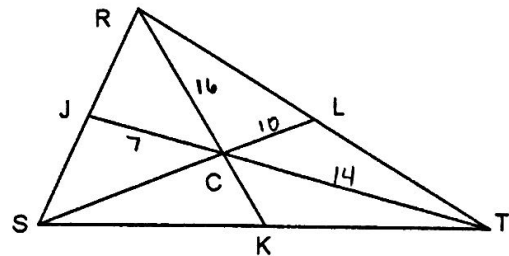
13. C is the centroid of $\triangle RST$. $RC = 16$, $CL = 10$, $TJ = 21$

Find:

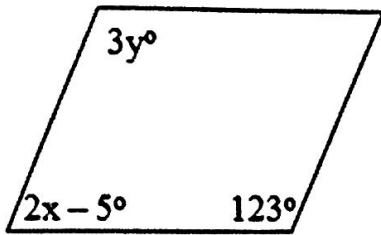
$$SC = \underline{20}$$

$$TC = \underline{14}$$

$$KC = \underline{8}$$



14. Given the following parallelogram, find the value of x and y .



$$2x - 5 + 123 = 180$$

$$2x + 118 = 180$$

$$2x = 62$$

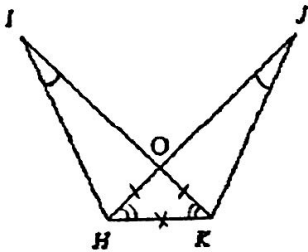
$$\boxed{x = 31}$$

$$3y = 123$$

$$\boxed{y = 41}$$

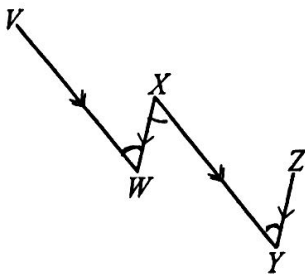
15. Given: $\angle I \cong \angle J$
 $\overline{HO} \cong \overline{KO}$

Prove: $\triangle HIK \cong \triangle KJH$



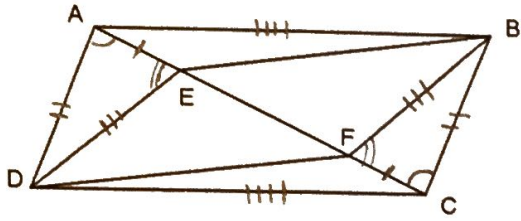
Statements	Reasons
$\angle I \cong \angle J$ $\overline{HO} \cong \overline{KO}$	given
$\overline{HK} \cong \overline{HK}$	reflexive property
$\angle DKH \cong \angle OHK$	In a triangle, angles opposite congruent sides are congruent
$\triangle HIK \cong \triangle KJH$	AAS \cong AAS

16. Given the labeled diagram at the right, prove that $\angle VWX \cong \angle XYZ$.



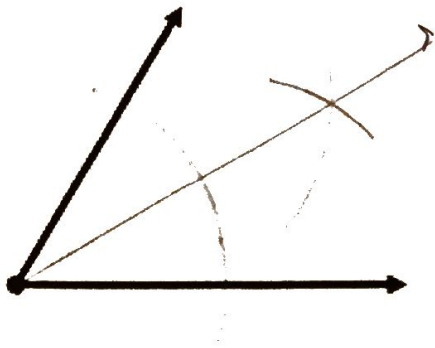
$\angle VWX \cong \angle WXY$ $\angle WXY \cong \angle XYZ$	When parallel lines are cut by a transversal, alternate interior angles are congruent
$\angle VWX \cong \angle XYZ$	substitution property.

17. ABCD is a parallelogram with $AE = CF$.
Prove that $DEBF$ is a parallelogram.

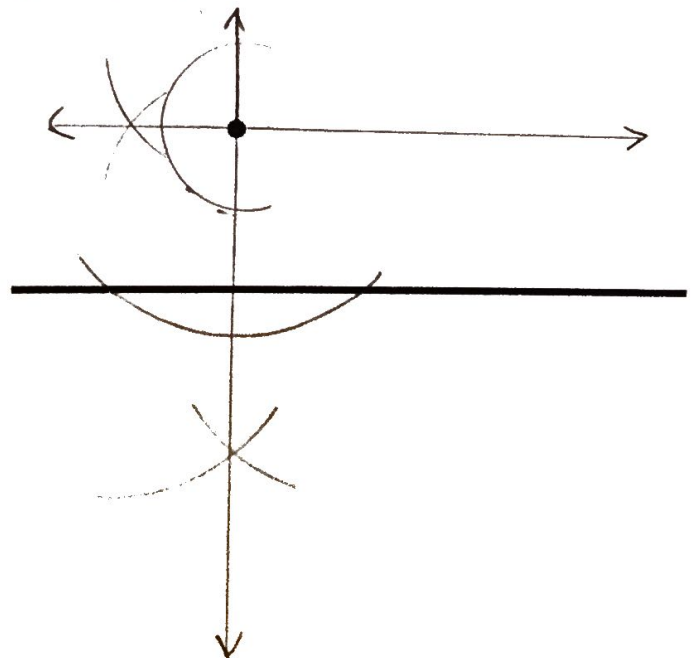


Statements	Reasons
ABCD is a parallelogram with $AE = CF$	Given
$\overline{DA} \cong \overline{CB}$ $\overline{AB} \cong \overline{CD}$	In a parallelogram, opposite sides are congruent.
$\overline{DA} \parallel \overline{CB}$	In a parallelogram, opposite sides are parallel.
$\angle DAC \cong \angle BCF$	When parallel lines are cut by a transversal, alternate interior angles are congruent.
$\triangle DAE \cong \triangle BCF$	SAS \cong SAS
$\overline{DE} \cong \overline{BF}$ $\angle AED \cong \angle CFB$	Corresponding parts of congruent triangles are congruent.
$DE \parallel BF$	If two lines are cut by a transversal such that a pair of alternate exterior angles are congruent, then the lines are parallel.
DEBF is a parallelogram	A quadrilateral is a parallelogram because there is one set of sides both parallel and congruent.

18. Bisect the given angle.

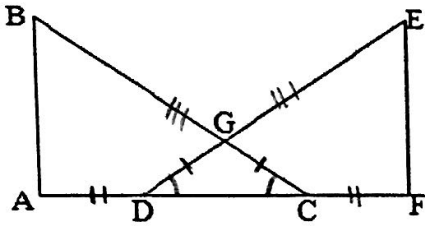


19. Construct a line parallel to the given line and through the given point.



20. Given: $\overline{DG} \cong \overline{CG}$, $\overline{AD} \cong \overline{FC}$, $\overline{BC} \cong \overline{ED}$

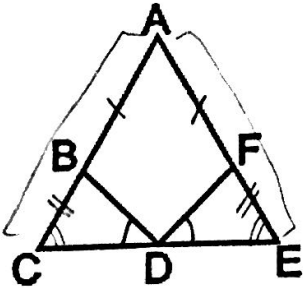
Prove: $\angle B \cong \angle E$



Statements	Reasons
$\overline{DG} \cong \overline{CG}$ $\overline{AD} \cong \overline{FC}$ $\overline{BC} \cong \overline{ED}$	given
$\overline{DC} \cong \overline{DC}$	reflexive property
$\overline{AC} \cong \overline{FD}$	addition property
$\angle GDC \cong \angle GCD$	In a triangle, angles opposite congruent sides are congruent
$\triangle BAC \cong \triangle FED$	SAS \cong SAS
$\angle B \cong \angle E$	Corresponding parts of congruent triangles are congruent

21. Given: $\triangle AEC$ is an isosceles triangle with $\overline{AC} \cong \overline{AE}$, $\overline{AB} \cong \overline{AF}$, $\angle BDC \cong \angle FDE$

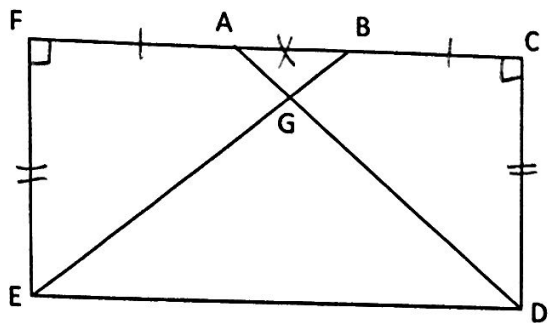
Prove: $\triangle CDB \cong \triangle FDE$



Statements	Reasons
$\triangle AEC$ is isosceles with $\overline{AC} \cong \overline{AE}$ $\overline{AB} \cong \overline{AF}$ $\angle BDC \cong \angle FDE$	given
$\angle C \cong \angle E$	Base angles of an isosceles triangle are congruent.
$\overline{BC} \cong \overline{FE}$	subtraction property
$\triangle CDB \cong \triangle FDE$	AAS \cong AAS

22. Given: $\overline{FA} \cong \overline{BC}$, $\overline{FE} \perp \overline{FC}$, $\overline{FC} \perp \overline{DC}$, $\overline{FE} \cong \overline{DC}$

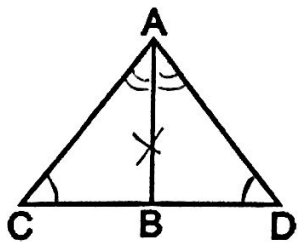
Prove: $\triangle BFE \cong \triangle ADC$



Statements	Reasons
$\overline{FA} \cong \overline{BC}$, $\overline{FE} \perp \overline{FC}$, $\overline{FC} \perp \overline{DC}$, $\overline{FE} \cong \overline{DC}$	given
$\overline{AB} \cong \overline{AB}$	reflexive property
$\overline{FB} \cong \overline{CA}$	addition property
$\angle F$ and $\angle C$ are right angles	perpendicular lines form right angles
$\angle F \cong \angle C$	all right angles are congruent
$\triangle BFE \cong \triangle ADC$	SAS \cong SAS

23. Given: $\angle C \cong \angle D$, \overline{AB} bisects $\angle CAD$

Prove: $\triangle CAB \cong \triangle DAB$



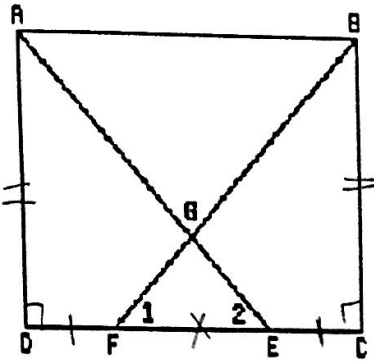
Statements	Reasons
$\angle C \cong \angle D$, \overline{AB} bisects $\angle CAD$	given
$\overline{AB} \cong \overline{AB}$	reflexive property
$\angle CAB \cong \angle DAB$	a bisector divides an angle into two congruent parts
$\triangle CAB \cong \triangle DAB$	AAS \cong AAS

24. Given: Rectangle ABCD, $\overline{DF} \cong \overline{CE}$

Prove: (a) $\triangle ADE \cong \triangle BCF$

(b) $\angle 1 \cong \angle 2$

(c) $\overline{GF} \cong \overline{GE}$



Statements	Reasons
Rectangle ABCD $\overline{DF} \cong \overline{CE}$	given
$\overline{FE} \cong \overline{FE}$	reflexive property
$\overline{DE} \cong \overline{CF}$	addition property
$\overline{AD} \cong \overline{BC}$	In a rectangle, opposite sides are congruent
$\angle D$ and $\angle C$ are right angles	In a rectangle, all angles are right angles
$\angle D \cong \angle C$	all right angles are congruent.
$\triangle ADE \cong \triangle BCF$	SAS \cong SAS
$\angle 1 \cong \angle 2$	Corresponding parts of congruent triangles are congruent
$\overline{GF} \cong \overline{GE}$	In a triangle, sides opposite congruent angles are congruent

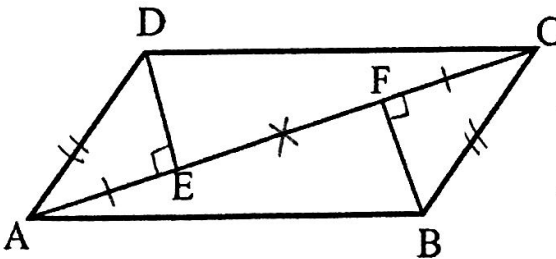
25. Given: Parallelogram ABCD

$\overline{DE} \perp \overline{AC}$

$\overline{BF} \perp \overline{AC}$

$\overline{AF} \cong \overline{CE}$

Prove: $\triangle DEA \cong \triangle BFC$

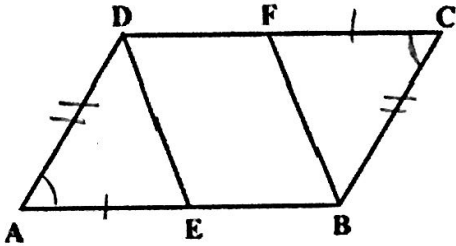


Statements	Reasons
Parallelogram ABCD $\overline{DE} \perp \overline{AC}$ $\overline{BF} \perp \overline{AC}$ $\overline{AF} \cong \overline{CE}$	given
$\angle DEA$ and $\angle BFC$ are right angles	perpendicular lines form right angles
$\angle DEA \cong \angle BFC$	all right angles are congruent.
$\overline{EF} \cong \overline{EF}$	reflexive property
$\overline{AE} \cong \overline{CF}$	subtraction property
$\overline{AD} \cong \overline{BC}$	In a parallelogram, opposite sides are congruent
$\triangle DEA$ and $\triangle BFC$ are right triangles	a triangle with a right angle is a right triangle
$\triangle DEA \cong \triangle BFC$	HL \cong HL

26. Given: Parallelogram ABCD, $\overline{AE} \cong \overline{FC}$

Prove: (a) $\triangle AED \cong \triangle CFB$

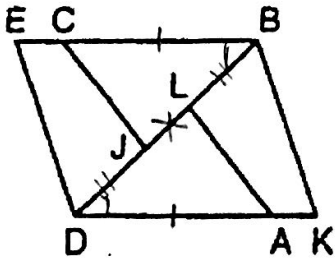
(b) DFBE is a parallelogram



Statements	Reasons
Parallelogram ABCD $\overline{AD} \cong \overline{BC}$ $\overline{DC} \cong \overline{AB}$	given In a parallelogram, opposite sides are congruent.
$\angle A \cong \angle C$	In a parallelogram, opposite angles are congruent.
$\triangle AED \cong \triangle CFB$	SAS \cong SAS
$\overline{DE} \cong \overline{FB}$	subtraction property
$\overline{DF} \cong \overline{BE}$	Corresponding parts of congruent triangles are congruent
DFBE is a parallelogram	a quadrilateral with both pairs of opposite sides congruent is a parallelogram

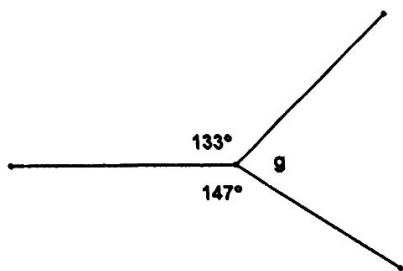
27. Given: Parallelogram DEBK, $\overline{BC} \cong \overline{DA}$, $\overline{DJ} \cong \overline{BL}$

Prove: $\overline{CJ} \cong \overline{AL}$



Statements	Reasons
Parallelogram DEBK $\overline{BC} \cong \overline{DA}$ $\overline{DJ} \cong \overline{BL}$	given
$\overline{LC} \cong \overline{LA}$	reflexive property
$\overline{DL} \cong \overline{LB}$	addition property
$\overline{EB} \parallel \overline{DK}$	In a parallelogram, opposite sides are parallel
$\angle CBD \cong \angle ADB$	when parallel lines are cut by a transversal, alternate interior angles are congruent.
$\triangle CJB \cong \triangle ALD$	SAS \cong SAS
$\overline{CJ} \cong \overline{AL}$	Corresponding parts of congruent triangles are congruent.

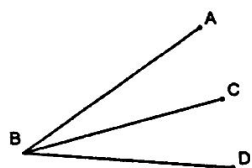
28. Solve for g .



$$g + 133 + 147 = 360$$

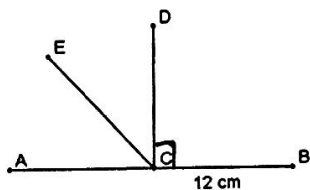
$$g = 80$$

29. In the diagram below, \overline{BC} is the bisector of $\angle ABD$, which measures 64° . What is the measure of $\angle ABC$?



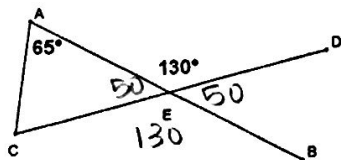
$$\angle ABC = 32$$

30. In the diagram below, \overline{DC} is the \perp bisector of \overline{AB} , and \overline{CE} is the angle bisector of $\angle ACD$. Find the measures of \overline{AC} and $\angle ECD$.



$$\begin{aligned} \angle ECD &= 45 \\ AC &= 12 \end{aligned}$$

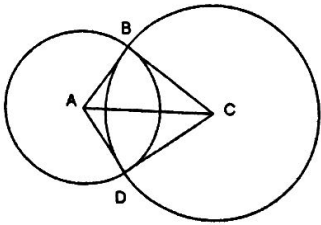
31. Given the labeled figure below, find the measures of $\angle DEB$ and $\angle ACE$. Explain your solutions.



$$\begin{aligned} \angle DEB &= 50 && \rightarrow \text{Linear pairs form} \\ \angle ACE &= 65 && \text{supplementary angles} \end{aligned}$$

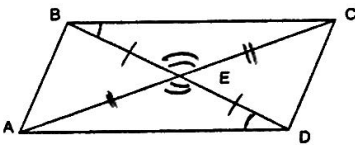
- ↓
- pairs of vertical angles are congruent
 - angles in a triangle sum to 180° .

32. $\triangle ABC$ and $\triangle ADC$ are formed from the intersections and center points of circles A and C. Prove $\triangle ABC \cong \triangle ADC$ by SSS.



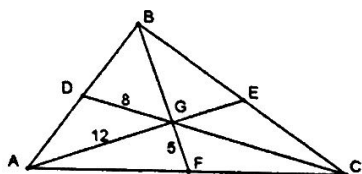
Statements	Reasons
$\overline{AB} \cong \overline{AD}$ $\overline{BC} \cong \overline{DC}$	In a circle, all radii are congruent.
$\overline{AC} \cong \overline{AC}$	reflexive property
$\triangle ABC \cong \triangle ADC$	SSS \cong SSS

33. In the figure below, $BE \cong DE$ and $\angle CBE \cong \angle ADE$. Prove $ABCD$ is a parallelogram.



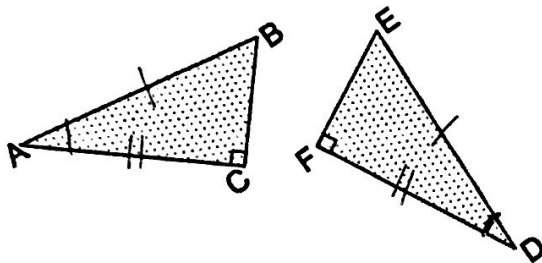
Statements	Reasons
$\overline{BE} \cong \overline{DE}$ $\angle CBE \cong \angle ADE$	given
$\angle BEC \cong \angle DEA$	pairs of vertical angles are congruent.
$\triangle BEC \cong \triangle DEA$	ASA \cong ASA
$\overline{EC} \cong \overline{AE}$	corresponding parts of congruent triangles are congruent.
\overline{BD} and \overline{CA} bisect each other	a line segment that divides a segment into two congruent parts is a bisector.
$ABCD$ is a parallelogram	a quadrilateral is a parallelogram if the diagonals bisect each other.

34. If \overline{AE} , \overline{BF} , and \overline{CD} are medians of $\triangle ABC$, find the lengths of segments BG , GE , and CG , given the labeled lengths.



$$\begin{aligned} BG &= 10 \\ GE &= 6 \\ CG &= 11 \end{aligned}$$

35. The triangles $\triangle ABC$ and $\triangle DEF$ in the figure below are such that $\overline{AB} \cong \overline{DE}$, $\overline{AC} \cong \overline{DF}$, and $\angle A \cong \angle D$.



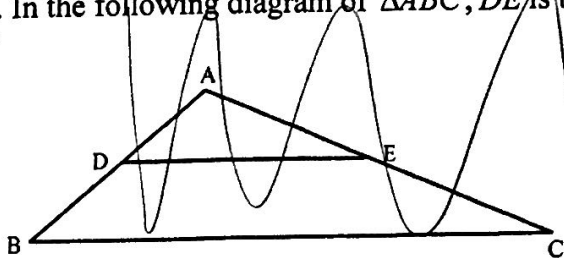
- a) Which criteria for triangle congruence implies that $\triangle ABC \cong \triangle DEF$?

$$SAS \cong SAS$$

- b) Describe a sequence of rigid transformations that shows $\triangle ABC \cong \triangle DEF$.

translation, rotation, reflection

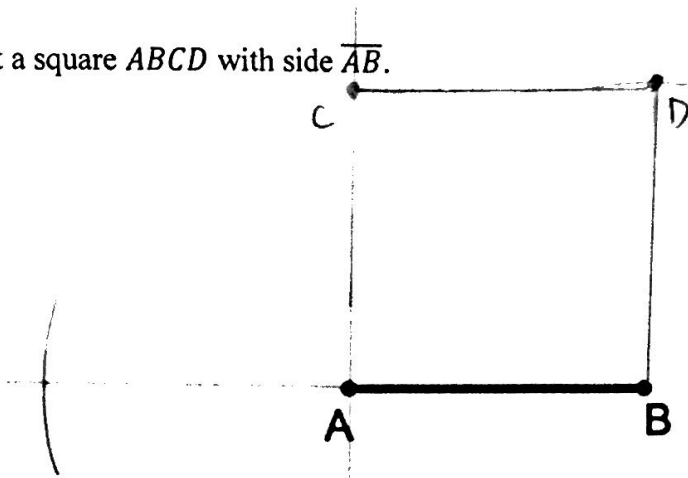
36. In the following diagram of $\triangle ABC$, \overline{DE} is the midsegment. If $BC = 32$ and $AB = 28$, find the length of:



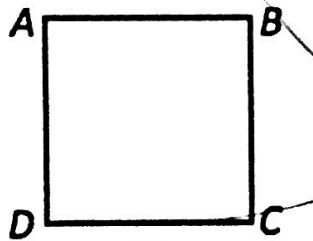
a) DE

b) AD

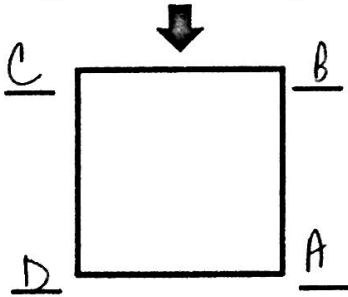
37. a) Construct a square $ABCD$ with side \overline{AB} .



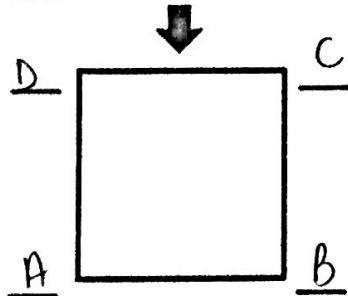
b) Three rigid motions are to be performed on square $ABCD$. The first rigid motion is the reflection through line \overline{BD} . The second rigid motion is a 90° clockwise rotation around the center of the square. Describe the third rigid motion that will ultimately map $ABCD$ back to its original position. Label the image of each rigid motion A , B , C , and D in the blanks provided.



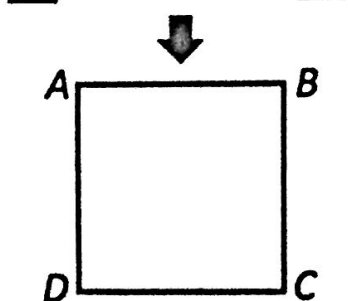
Rigid Motion 1 Description: Reflection through line \overline{BD}



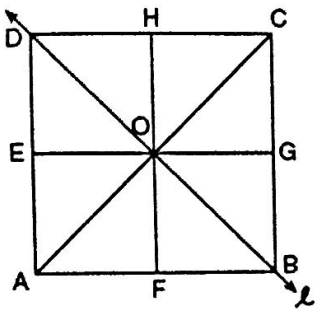
Rigid Motion 2 Description: 90° clockwise rotation around the center of the square.



Rigid Motion 3 Description: 180° rotation around center of the square.



38. In the accompanying diagram of square $ABCD$, F is the midpoint of \overline{AB} , G is the midpoint of \overline{BC} , H is the midpoint of \overline{CD} , and E is the midpoint of \overline{DA} .



Find the following:

- What is the image of point F after a rotation of 90 degrees with center O ? B
- What is the image of \overline{AF} after a reflection over line \overline{EG} ? \overline{DH}
- What is the image of point H after a rotation of 180 degrees with center O ? F
- What is the image of point G after a rotation of 270 degrees with center O ? F
- Find the image of the following compositions:

i. $T_{\overline{FO}}(R_{0,270^\circ}(G)) = O$

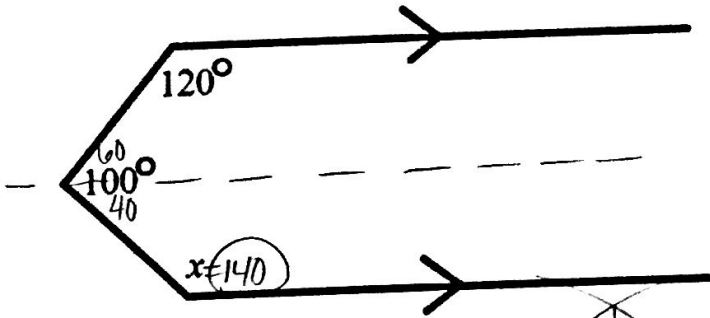
ii. $R_{0,90^\circ}(r_{\overline{AF}}(\overline{AE})) = \overline{ED}$

iii. $R_{0,-90^\circ}(r_{\overline{EG}}(B)) = B$

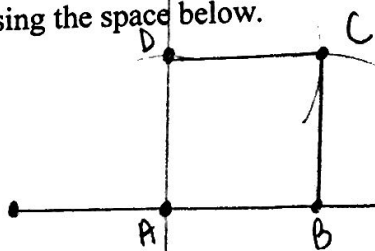
iv. $T_{\overline{BF}} \circ r_{\overline{HF}}(E) = O$

v. $r_{\overline{EG}} \circ T_{\overline{GB}}(D) = H$

39. Find x .



40. Construct a Square $ABCD$ using the space below.



41. Construct a square $ABCD$ and a square $AXYZ$ so that \overline{AB} contains X and \overline{AD} contains Z .

