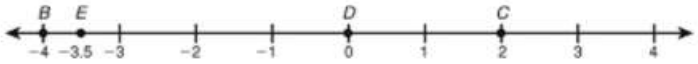
# Geometry – Semester 2 Review

## Test 1: Tools of Geometry/Algebraic & Geometric Proofs (ch. 1 and 2)

**1.** Find the length of the segment EC, BD, BE using the Ruler Postulate.

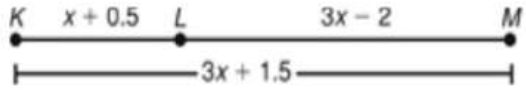



**2.** $T$ is in the interior of $\angle PQR$.

Find x.

$m\angle PQR = (10x - 7)°$, $m\angle RQT = 5x°$, and $m\angle PQT = (4x + 6)°$

**3.** Find LM.




**4.** $\overrightarrow{GJ}$ bisects $\angle FGH$, $m\angle FGJ = (7x - 9)°$, and $m\angle HGJ = (2x + 36)°$.

What is $m\angle FGH$?

**5.** H is the midpoint of IJ.

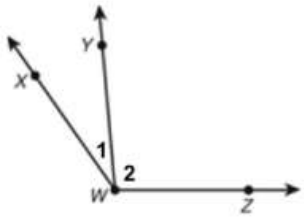
IJ = 9.4.

Find IH.

**6.** What is the next letter in the sequence?

D, H, L, P, . . .

**7.** Name each of the angles in as many ways as possible.



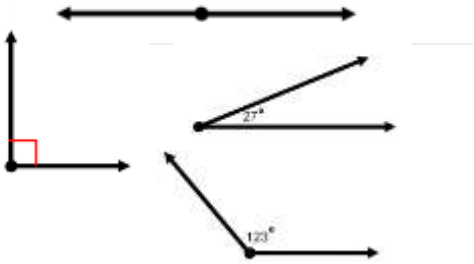

**8. Honors Only**

Complete the conjecture.

Provide at least three examples.

The square of any negative number is _____.

**9.** Classify each angle below.




**10. Honors Only**

Show that each conjecture is false by finding a counterexample.

For any number $n$, $2n > n$.

**11.** Name the property that justifies each of the following statements.

a) 3 – x = 3 – x  b) If x = -2, then -2 = x  c) If x – 2 = 2, then x = 4  d) $\overline{EF} \cong \overline{EF}$

e) If a = 2, and 2 = p, then a = p  f) If 3x = 12, then x = 4  g) If x + 2 = 6, then x = 4

h) If 3(x - 9), then 3x – 27  i) If a = 2, then 2 can be plugged in for a in any expression

j) $\angle A \cong \angle B$ and $\angle B \cong \angle C$, so $\angle A \cong \angle C$.  k) $\angle 1 \cong \angle 2$, so $\angle 2 \cong \angle 1$.

l) If $a = b$, then $a - c = b - c$  m) If $a = b$ and $c \neq 0$, then $\frac{a}{c} = \frac{b}{c}$

**12.** Use the indicated property to complete each statement.

a) Reflexive Property of Congruence: 9 – 2x = _____

b) Division Property of Equality: If 5x = 30, then _____.

c) Symmetric Property of Equality: If x = -2, then _____.

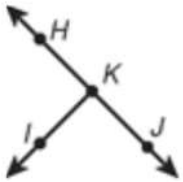
d) Transitive Property of Congruence: ∠A ≅ ∠B and ∠B ≅ ∠C, so _____.

**13.** Write a two-column proof for the problem below.

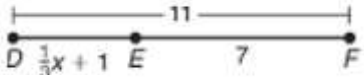
**Given:** ∠*HKJ* is a straight angle.

$\overrightarrow{KI}$ bisects ∠*HKJ*.

**Prove:** ∠*IKJ* is a right angle.




**14.** Complete the following algebraic proof.

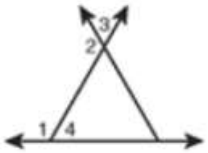



| | |
|---|---|
| $DE + EF = DF$ | _____ |
| $\left(\frac{1}{3}x + 1\right) + 7 = 11$ | _____ |
| $\frac{1}{3}x + 8 = 11$ | _____ |
| $\frac{1}{3}x = 3$ | _____ |
| $x = 9$ | _____ |

**15.** Write a two-column proof for the problem below.

**Given:** ∠4 ≅ ∠3

**Prove:** m∠1 = m∠2




**16.** Write a two-column proof for the problem below.


**Given:** $AB = CD, BC = DE$

**Prove:** $C$ is the midpoint of $\overline{AE}$.

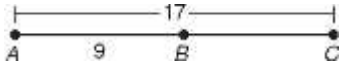
**17.** Solve the following equations. Show all your steps and write a justification for each step.

a) $\frac{2}{5}(m + 10) = -4$ b) 4y – 1 = 27 c) 60 = 2(x + 12)

**18.** Miguel breaks a 17-centimeter-long pencil into two pieces. One of the pieces is 9 centimeters long. Use the given paragraph proof to complete the two-column proof showing that the other piece is 8 centimeters long.

**Given:** *AC* = 17, *AB* = 9

**Prove:** *BC* = 8

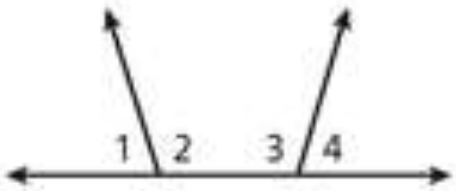



By the Segment Addition Postulate, the sum of *AB* and *BC* equals *AC*. That is, *AB* + *BC* = *AC*. It is given that *AC* = 17 and *AB* = 9. Substitution leaves the equation 9 + *BC* = 17. Using the Subtraction Property of Equality to take 9 away from both sides shows that *BC* = 8.

| Statements | Reasons |
|---|---|
| 1. *AB* + *BC* = *AC* | 1. a. _____ |
| 2. *AC* = 17, *AB* = 9 | 2. Given |
| 3. b._____ | 3. Subst. |
| 4. c._____ | 4. Subtr. Prop. of = |

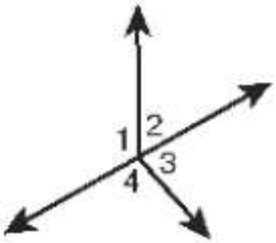
**19.** Write a two-column proof for the problem below.

**Given:** $m\angle 1 + m\angle 3 = 180°$
**Prove:** $\angle 1 \cong \angle 4$



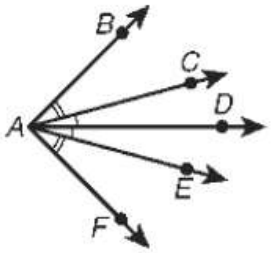

**20.** Use the given plan to write a two-column proof.

**Given:** $\angle 1$ and $\angle 2$ form a linear pair, and $\angle 3$ and $\angle 4$ form a linear pair.
**Prove:** $m\angle 1 + m\angle 2 + m\angle 3 + m\angle 4 = 360°$
**Plan:** The Linear Pair Theorem shows that $\angle 1$ and $\angle 2$ are supplementary and $\angle 3$ and $\angle 4$ are supplementary. The definition of supplementary says that $m\angle 1 + m\angle 2 = 180°$ and $m\angle 3 + m\angle 4 = 180°$. Use the Addition Property of Equality to make the conclusion.




**21.** Write a two-column proof for the problem below.

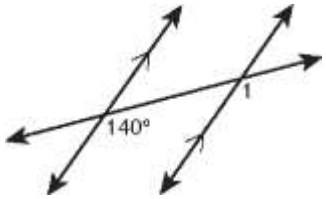
**Given:** $m\angle BAC = m\angle EAF$, $m\angle CAD = m\angle DAE$
**Prove:** $m\angle BAD = m\angle DAF$



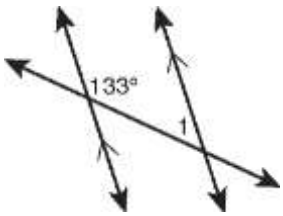

## Test 2: Proving Theorems about Lines and Angles (ch. 3 and 4)

Find each angle measure. Write the theorem that justifies how you found your answer.

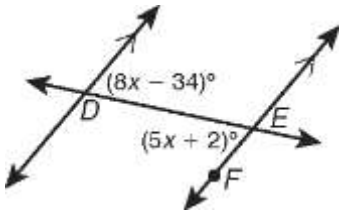
**22.** $m\angle 1$



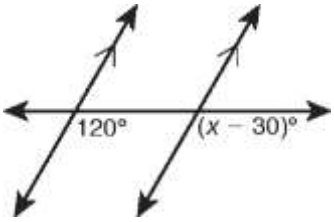

**23.** $m\angle 1$




**24.**



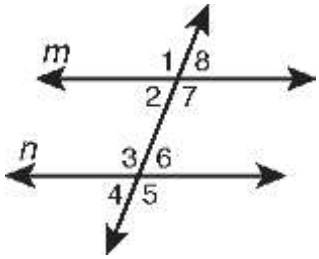

**25.**



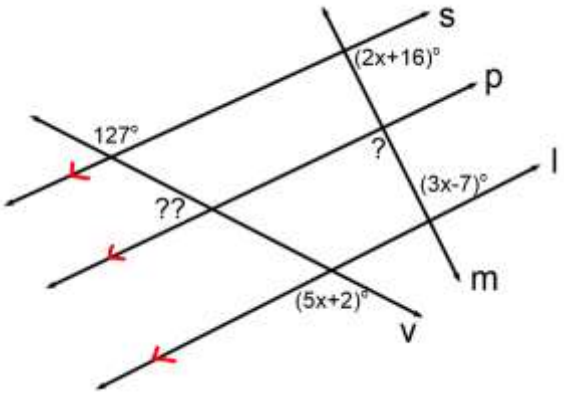

**26.** Use the figure for Exercises 52-55. Tell whether lines *m* and *n* must be parallel from the given information. If they are, state your reasoning**.**

a) $\angle 7 \cong \angle 5$ b) $\angle 7 \cong \angle 6$

c) $\angle 1 \cong \angle 5$ d) $\angle 2 \cong \angle 8$

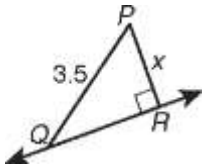


**27.** Solve for x and the missing variables.

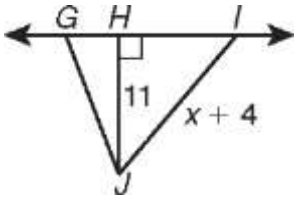



**28.** Name the shortest segment from the point to the line and write an inequality for *x*.

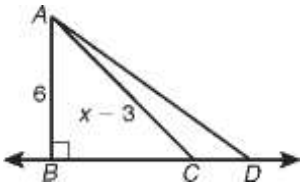
a)




b)




c)




**29.** Draw a line segment label the endpoints F and G. Construct the perpendicular bisector.

**30.** Draw a line segment label the endpoints K and L. Construct a congruent segment labeled M and N.

**31.** Draw an angle label it A. Construct the angle bisector.

**32.** Draw an angle, label B. Construct a congruent angle to B and label it C.

**33.** Identify and describe each of the following transformations according to their rules. Then tell whether or not the transformation is an isometry.

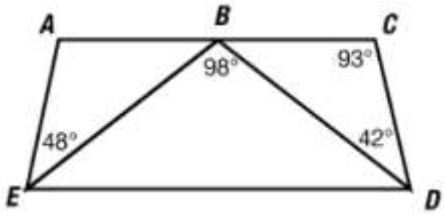
a) M: (x, y) ⟶ (x - 2, y + 3)

b) M: (x, y) ⟶ (x, -y)

c) M: (x, y) ⟶ (-y, x)

d) M: (x, y) ⟶ (3x, 3y)

**34.** Use the image below…



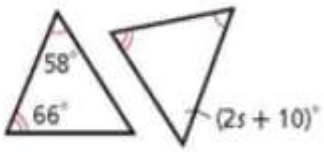

a) Find m∠CBD.

b) Find m∠A.

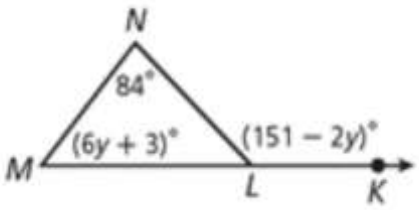
**35.** The measure of one of the acute angles in a right triangle is 59 degrees.

Find the measure of the other acute angle?

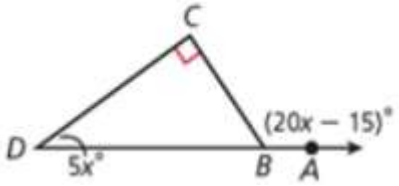
**36.** Find s.




**37.** Find y.



**38.** Find x.

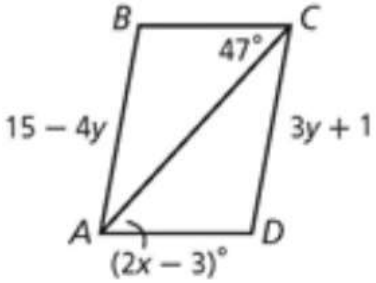



**39.** ΔJKL ≅ ΔDEF. Identify all of the congruent corresponding parts.

**40.** ΔABC ≅ ΔCDA.

a) Find x.

b) Find y.

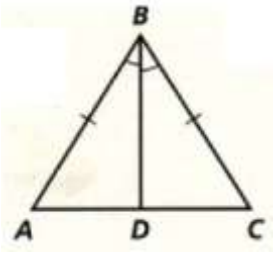



**41.** A transformation that results in an image that is congruent to the pre-image is called a(n) _____.

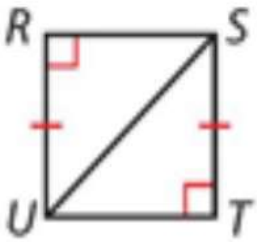
## Test 3: Proving Triangles Congruent (ch. 5)

Determine which postulate/theorem (if any) can be used to prove the given triangles congruent. Explain. Give a congruence statement, if applicable.

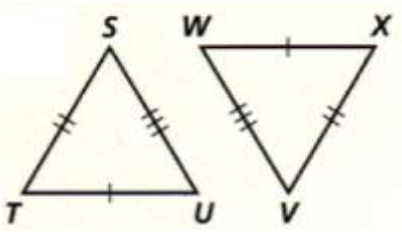
**42.**



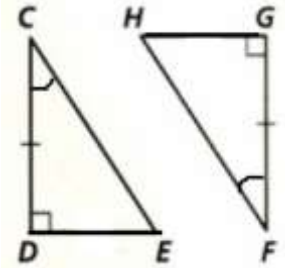

**43.**



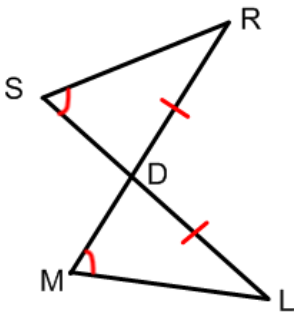

**44.**



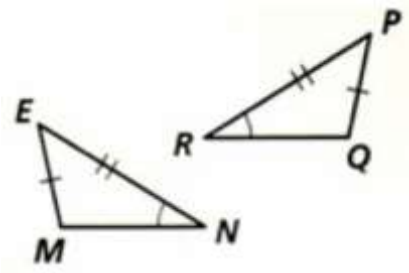

**45.**




**46.**




**47.**

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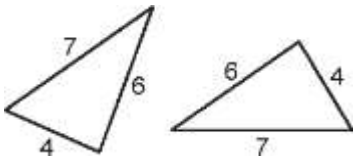
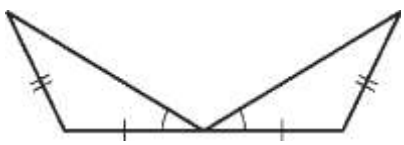



**49.**



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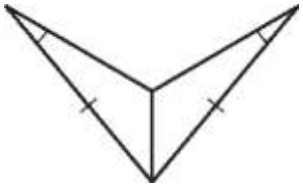
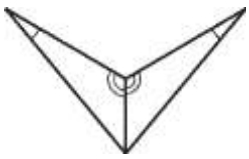


**51.**



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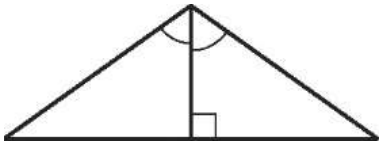
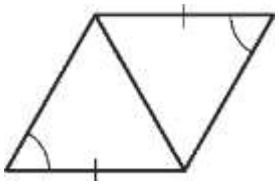
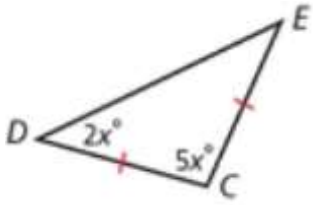


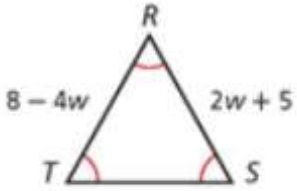
**53.**



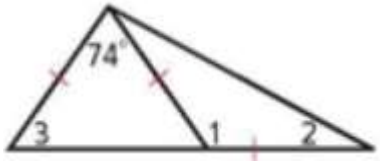
**54**. Find x.




**55.** Find w.




**56.** Find m∠3, m∠1, and m∠2.




**57.** Write a two-column proof.

**Given:** $\overleftrightarrow{AB} \parallel$

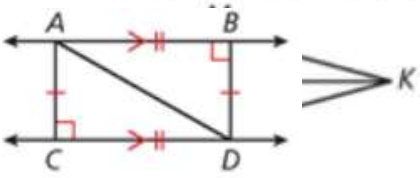
$\overline{AC} \perp$

**Prove:** $\triangle ACL$

**58.** Write a two-column proof.

**Given:** $\overline{JK}$ bisects $\angle MJN$. $\overline{MJ} \cong \overline{NJ}$

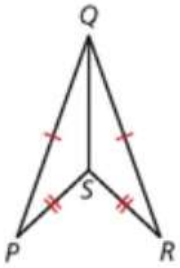
**Prove:** $\triangle MJK \cong \triangle NJK$




**59.** Write a two-column proof.

**Given:** $\overline{PQ} \cong \overline{RQ}$, $\overline{PS} \cong \overline{RS}$

**Prove:** $\overline{QS}$ bisects $\angle PQR$.



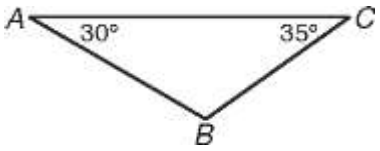

**60.** Write a two-column proof.

**Given:** $\overline{CD} \parallel \overline{BE}$, $\overline{DE} \parallel \overline{CB}$

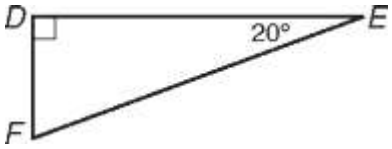
**Prove:** $\angle D \cong \angle B$

**Find the measure of each angle. Then, write the theorem that supports your answer.**

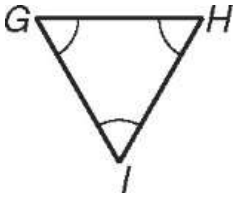
**61.**



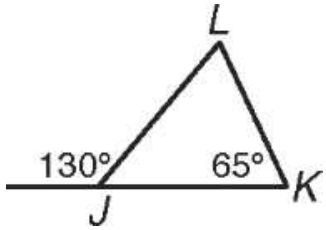

**62.**



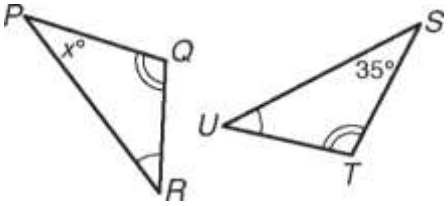

**63.**



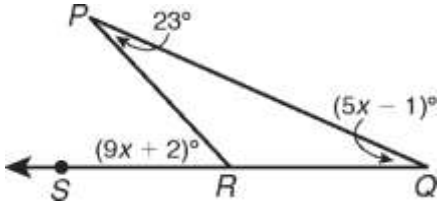

**64.**



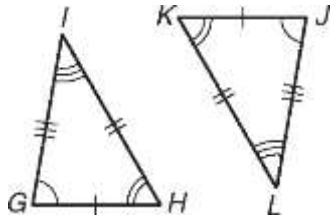

**65.**




**66.**



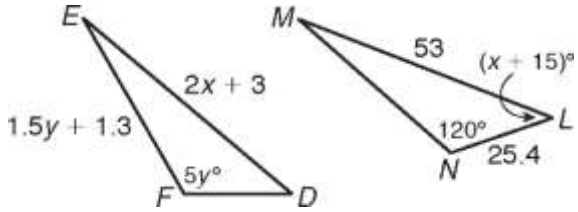
**67.** Name all of the corresponding parts if $\triangle GHI$ and $\triangle JKL$.




**68.** Given: $\triangle DEF \cong \triangle LMN$**.** Find each value.

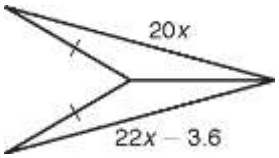
a) m$\angle L$

b) $EF$

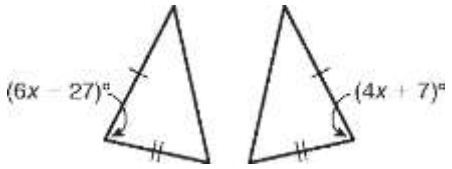



**Find the value of *x* so that the triangles are congruent.**

**69.**



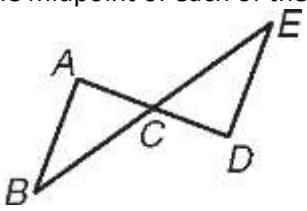

**70.**




**71.** The Hatfield and McCoy families are feuding over some land. Neither family will be satisfied unless the two triangular fields are exactly the same size. You know that ***C*** is the midpoint of each of the intersecting segments. Write a two-column proof that will settle the dispute.

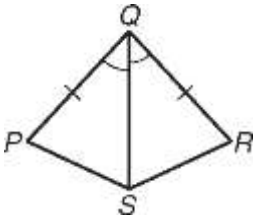
**Given:** $C$ is the midpoint of $\overline{AD}$ and $\overline{BE}$.

**Prove:** $\triangle ABC \cong \triangle DEC$



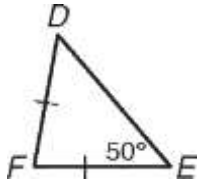

**72. Given:** $\overline{PQ} \cong \overline{RQ}$, $\angle PQS \cong \angle RQS$

**Prove:** $\angle P \cong \angle R$

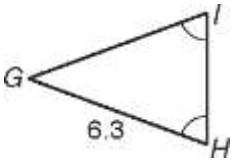



Find each value.

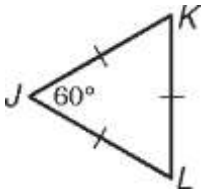
**73.** angle D



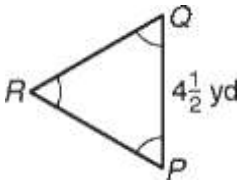

**74.** GI



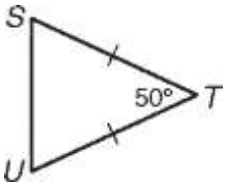

**75.** angle L



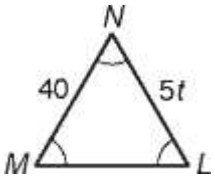

**76.** RQ



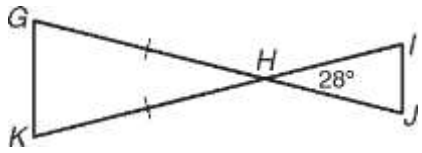

**77.** angle U



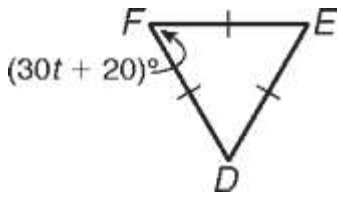

**78.** T



**79.** angle K

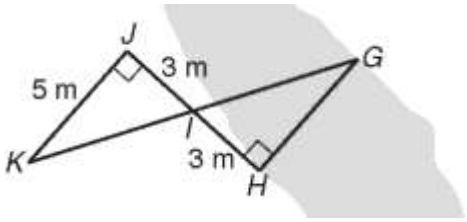



**80.** t




**81.** What does CPCTC stand for?

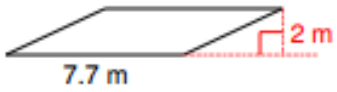
**82.** Some hikers come to a river in the woods. They want to cross the river but decide to find out how wide it is first. So they set up congruent right triangles. The figure shows the river and the triangles. Find the width of the river, *GH*, and give your reasoning.



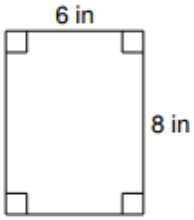

## Test 4: Volume and Area (ch. 11)

Find the area of the following figures. Give answers in terms of pi when necessary, otherwise round to the nearest tenth.

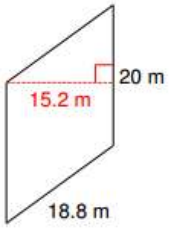
**83.**



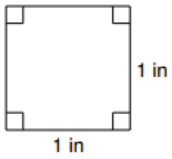

**84.**



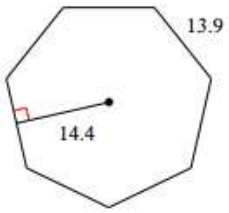

**85.**



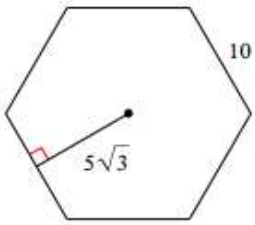

**86.**



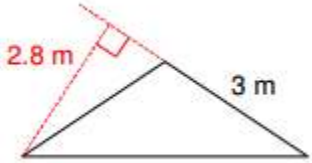

**87.** Honors Only




**88.** Honors Only

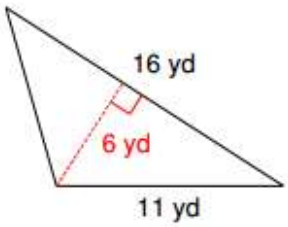



**89.**

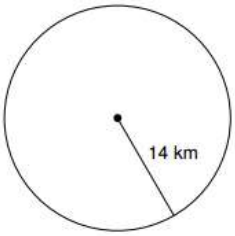



**90.**

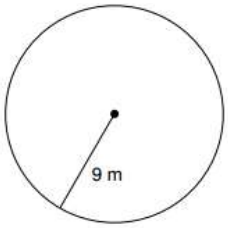

**91.**




**92.**




**93.**




**94.** Find the circumference


**95.** Honors Only

Find the radius of a circle so that its area and circumference have the same value.

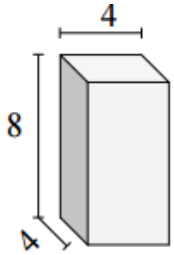
**96.** Find the area of a circle if the circumference is 6π yd.

**97.** Find the diameter of a circle if the area is 201.1 $in^2$

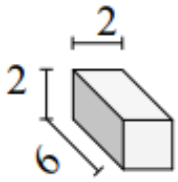
**98.** Find the radius of a circle is the circumference is 62.8 mi.

*Find the volume of the following figures. If you are in honors, also find the surface area. Give answers in terms of pi when necessary, otherwise round to the nearest tenth.*

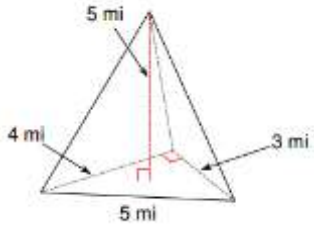
**99.**



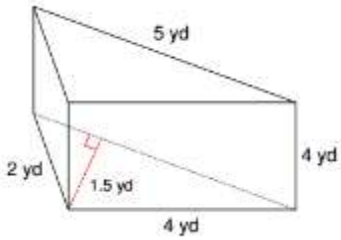

**100.**



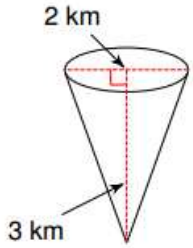

**101.**



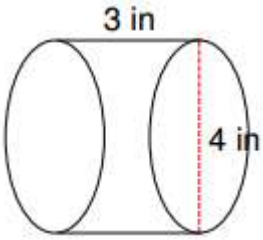

**102.**



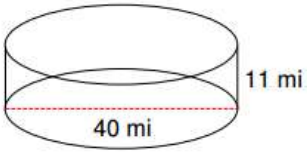

**103.**



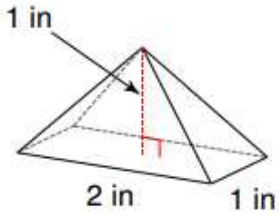

**104.**




**105.**



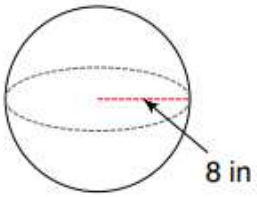

**106.**



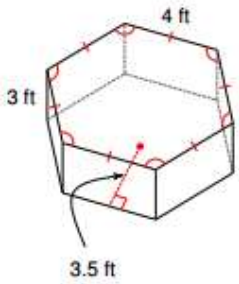

**107.**

A cone with a diameter of 20 cm and a height of 20 cm.

**108.**

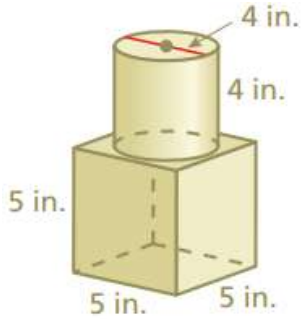



**109.** HONORS ONLY

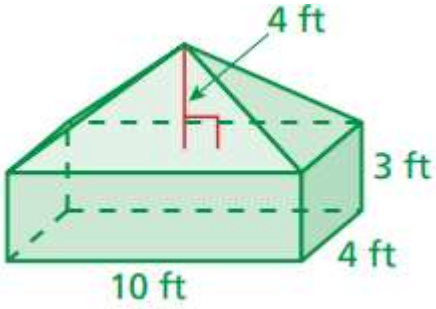



**110.** A sphere with a diameter of 16 ft.

**111.** Find the volume of the composite figure.



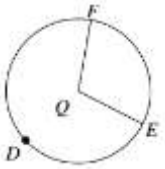

**112.** Find the volume of the composite figure.



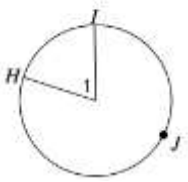
Test 5: Circles (ch. 12)

**113.** Name the arc made by the given angle.

a) $\angle FQE$

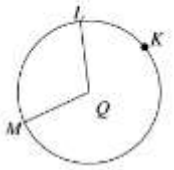



b) $\angle 1$

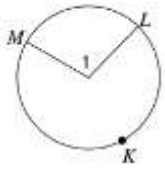



**114.** Name the central angle of the given arc.

a) $\overset{\frown}{ML}$

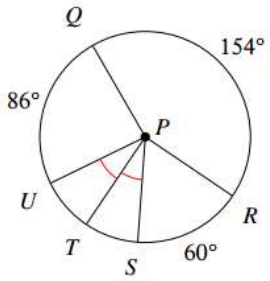



b) $\overset{\frown}{ML}$

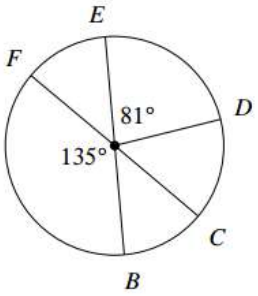



**115.** Find the measures of <u>all</u> missing arcs and angles.

a)

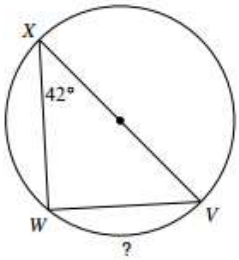



b)

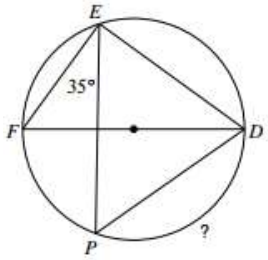



**116.** Find the measures of the arc or angle indicated.

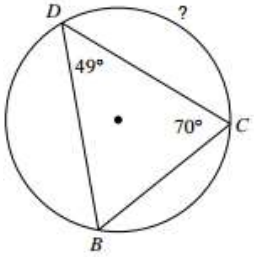
a)



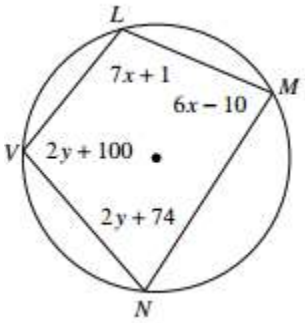

b)



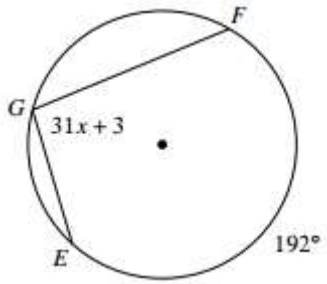

c)



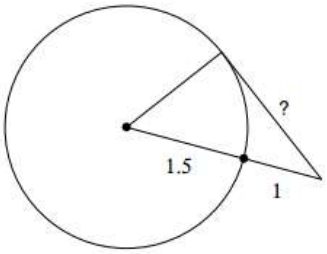

**117.** Find all angle measure of the quadrilateral LMNV.



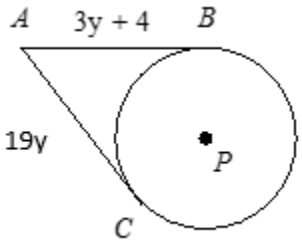

**118.** Honors Only: Solve for x



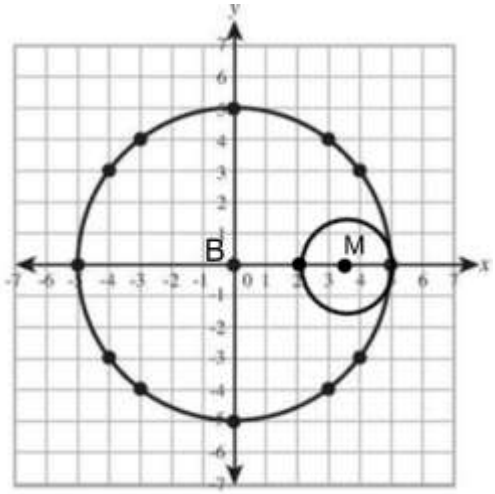

**119.** Find the missing measure.



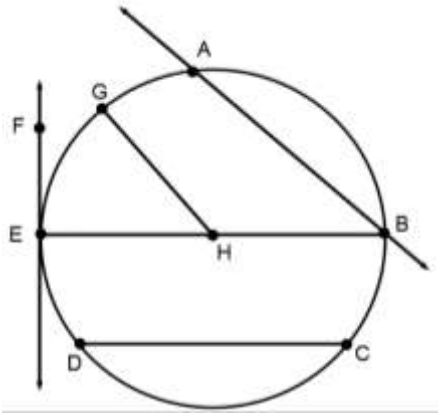

**120.** Segments AB and AC are tangent to circle C. Find AC.



**121.** Find the length of each radius. Identify the point of tangency and write the equation of the tangent line at that point.



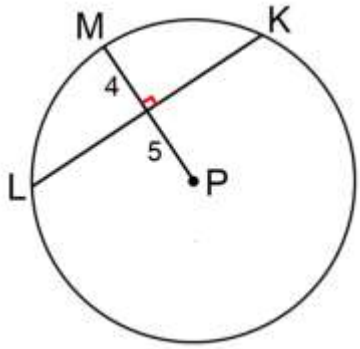

**122.** Identify the chords, tangent, radii, secant, and diameter in the circle below.



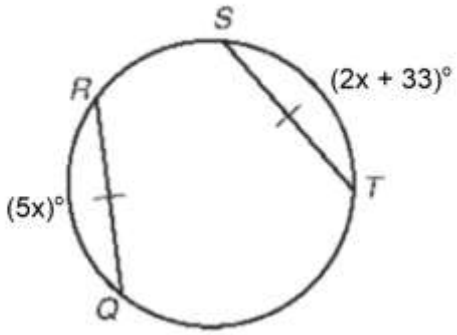

**123.** Find the arc length of an arc with measure 53 degrees in a circle with a diameter of 12 feet. Give your answer in terms of pi and rounded to the nearest hundredth.

**124.** Find the area of a segment of a circle, if the central angle is 60° and the radius is 7 inches. Round your answer to the nearest hundredth.

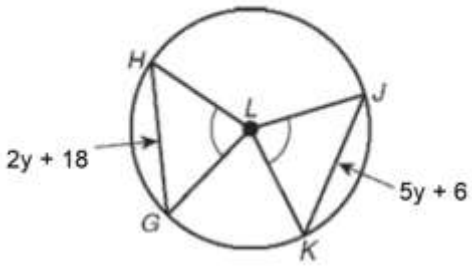
**125.** Find LK. Round to the nearest tenth.



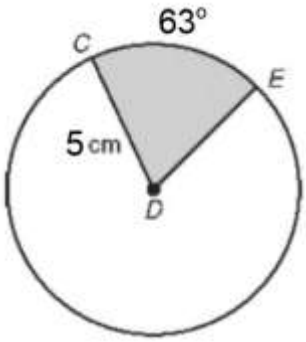

**126.** $\overline{QR} \cong \overline{ST}$. Find $m\overset{\frown}{QR}$.



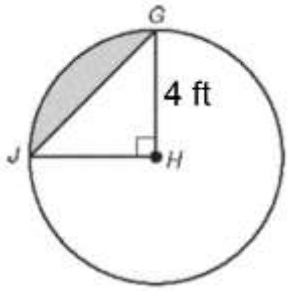

**127.** $\angle HLG \cong \angle KLJ$. Find $GH$.




**128.** Find the area of the shaded sector. Give your answer in terms of pi and to the nearest tenths place.



**129.** Find the area of the shaded segment to the nearest hundredth.

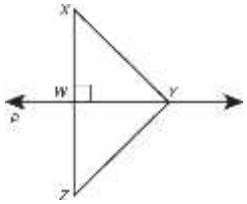



**130.** Draw a circle with the following conditions in the space provided. Circle J should have a minor arc $\widehat{KL}$, semicircle $\widehat{MLT}$, and a major arc $\widehat{KLP}$.

## Last Quiz: Special Points and Segments in Triangles & Parallelograms (Ch. 6 and 7.1-7.2)

**131.** a) Given that *XZ* = 38, *YX* = 27, and *YZ* = 27, find *ZW.*

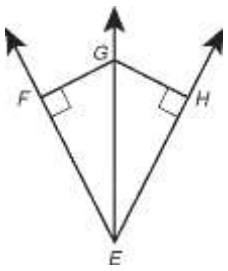
b) Given that line *p* is the perpendicular bisector of $\overline{XZ}$; *XY* = 4*n*, and *YZ* =14, find *n*.




**132.** a) Given that *FG* = *HG* and m<*FEH* = 58, find m<*GEH.*

b) Given that $\overleftrightarrow{EG}$ bisects ∠*FEH* and $GF = \sqrt{2}$, find *GH.*

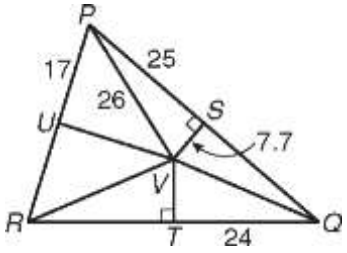
c) Given that ∠*FEG* ≅ ∠*HEG*, *FG* = 10*z* – 30, and *HG* = 7*z* + 6, find *FG.*




**133.** ***HONORS ONLY*** Find the equation of the perpendicular bisector through the segment with endpoints M(3, 6) and N(7, 2). (You might want to use graph paper)

**134.** Use the figure. $\overline{SV}, \overline{TV}, and\ \overline{UV}$ are perpendicular bisectors of the sides of **Δ***PQR***.** Find each length.

a) RV b) TR c) PR

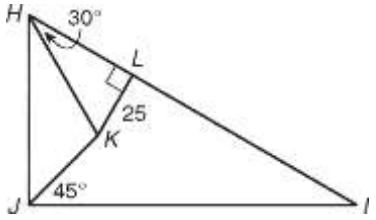



**135.** Use the figure. $\overline{HK}\ and\ \overline{JK}$ are angle bisectors of ΔHIJ. Find each measure.

a) the distance from K to $\overline{JI}$

b) angle JHK

c) angle HJI

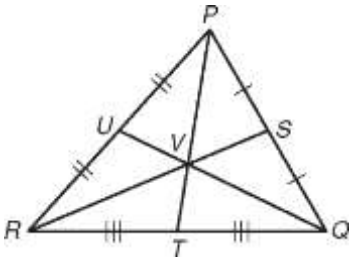



**136.** Use the figure. $\overline{QU}, \overline{PT}\ and\ \overline{RS}$ are medians of ΔPQR. RS = 21 and VT = 5. Find each length.

a) RV

b) SV

c) TP



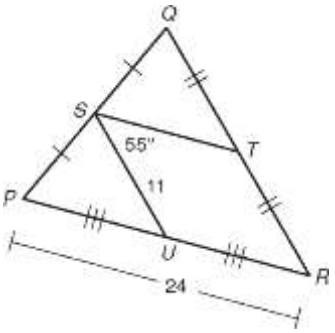

**137.** Use the figure. Find each measure.

a) ST

b) QR

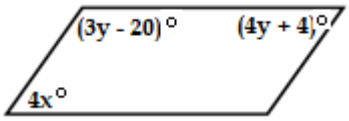
c) PU

d) m<SUP

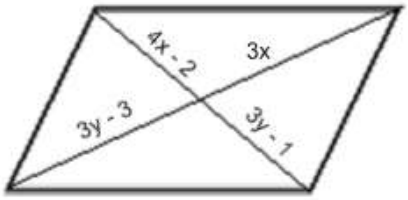


**138.** For each parallelogram, find the missing variables.

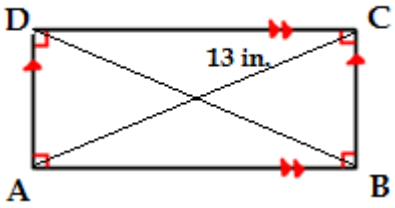
a)



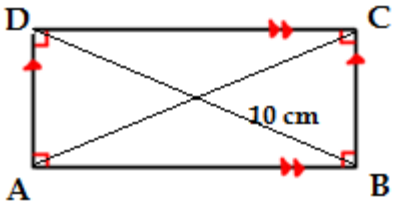

b)




c) Find AC



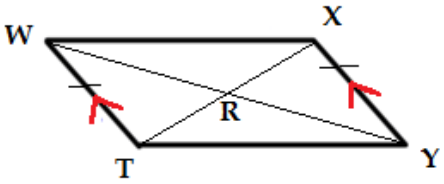

d) Find AC




**139.** Write a two column proof

Given: TW || YX and TW ≅ YX

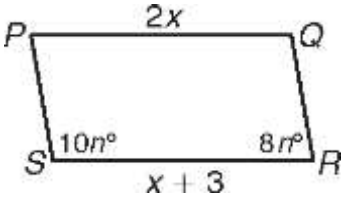
Prove: WR ≅ YR




**140.** PQRS is a parallelogram. Find each measure.

a) RS

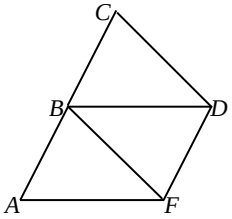
b) angle S




**141.** Complete the two-column proof.

**Given**: *ABDF* and *FBCD* are parallelograms.

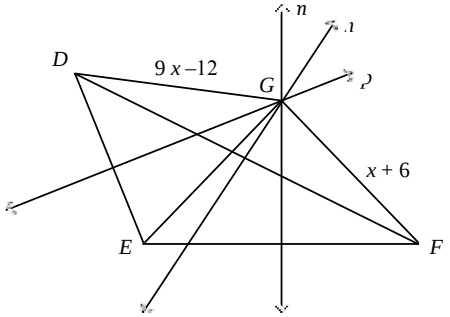
**Prove**: $\angle BCD \cong \angle ABF$



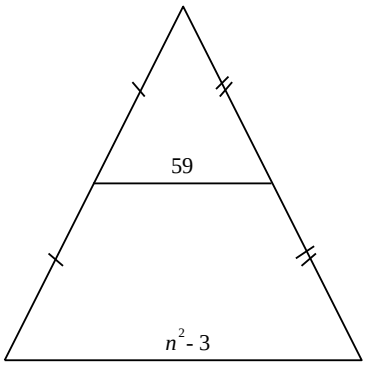

**Proof**:

| Statements | Reasons |
|---|---|
| 1. *ABDF* and *FBCD* are parallelograms. | 1. Given |
| 2. $\angle BCD \cong \angle DFB$ | 2. _____ |
| 3. $\overline{DF} \parallel \overline{AB}$ | 3. Opposite sides in a parallelogram are parallel. |
| 4. $\angle DFB \cong \angle ABF$ | 4. _____ |
| 5. $\angle BCD \cong \angle ABF$ | 5. Substitution |

**142.** Lines *m*, *n,* and *p* are the perpendicular bisectors of $\triangle DEF$. Find *EG*.




**143.** Find the value of *n* in the triangle.




**144.** Compare incenter and circumcenter. How are they similar? How are they different? (Be detailed.)

**145.** Determine if the quadrilateral is a parallelogram. Justify your answer.

a) $\overline{LK} \cong \overline{MN}$ and $\overline{LM} \| \overline{MN}$ b) $\overline{LK} \cong \overline{MN}$ and <KLN ≅ <LMN c) <KLM ≅ <MNK and <LMN ≅ <NKL