

2.1 : $\perp \Rightarrow \text{rt } \angle s$
 $\text{rt } \angle s \Rightarrow \perp$

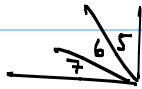
2.2 : comp $\angle s$

only 2 $\angle s$

90°



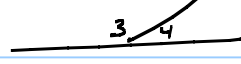
$\angle 1 \text{ comp } \angle 2$



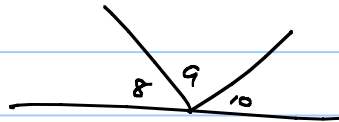
not comp

supp $\angle s$

180°



$\angle 3 \text{ supp } \angle 4$



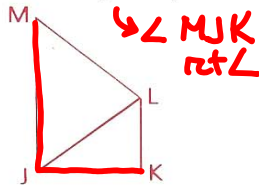
not supp

$\neq \perp \neq$

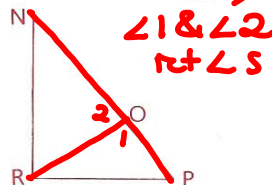
Problem Set A, continued

2 In each of the following, name the angles that can be proved to be right angles.

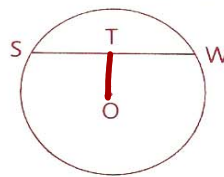
a Given: $\overline{JM} \perp \overline{JK}$



b Given: $\overline{RO} \perp \overline{PN} \Rightarrow$



c Given: $\overline{OT} \perp \overline{SW}$



None

$90^\circ \rightarrow 89^\circ 60' \rightarrow 89^\circ 59' 60''$

3 In each of the following, find the measure of $\angle 1$.

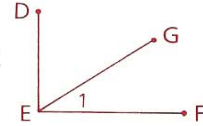
a $\overline{AB} \perp \overline{BC}$,

$\angle 2 = 68^\circ 17' 34''$

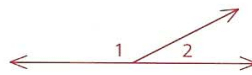


b $\overline{DE} \perp \overline{EF}$;

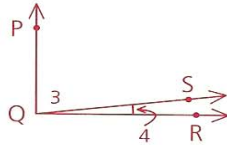
\overline{EG} bisects $\angle DEF$.



4 a $\angle 1$ is five times as large as $\angle 2$. Find $m\angle 2$.



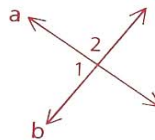
b $\angle 3$ is 72 times as large as $\angle 4$, and $\overline{PQ} \perp \overline{QR}$. Find $m\angle 4$ to the nearest tenth. (Hint: Use a calculator to do the arithmetic.)



5 On a graph, point A is at (0, 4). Point A is then rotated 90° clockwise about the origin to point A'. What are the coordinates of A'?

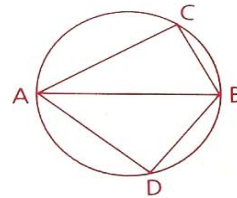
6 Given: $a \perp b$

Prove: $\angle 1 \cong \angle 2$ (Hint: This proof takes more than two steps. Remember, each reason should be a single sentence or less.)



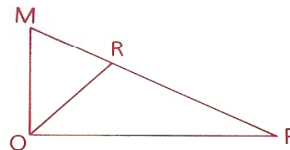
7 Given: $\angle ACB = 90^\circ$,
 $\overline{AD} \perp \overline{BD}$

Prove: $\angle C \cong \angle D$ (Hint: This proof takes more than three steps.)



8 Given: $\angle MOR = (3x + 7)^\circ$,
 $\angle ROP = (4x - 1)^\circ$,
 $\overline{MO} \perp \overline{OP}$

Which angle is larger, $\angle MOR$ or $\angle ROP$?



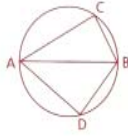
6 Given: $a \perp b$

Prove: $\angle 1 = \angle 2$ (Hint: This proof takes more than two steps. Remember, each reason should be a single sentence or less.)

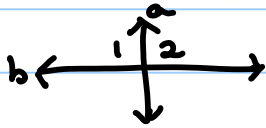


7 Given: $\angle ACB = 90^\circ$,
 $\overline{AD} \perp \overline{BD}$

Prove: $\angle C = \angle D$ (Hint: This proof takes more than three steps.)



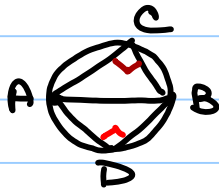
6. G: $a \perp b$
P: $\angle 1 \cong \angle 2$



Statements	Reasons
1. $a \perp b$	1. Given
2. $\angle 1$ & $\angle 2$ rt \angle s	2. $\perp \Rightarrow$ rt \angle
3. $\angle 1 \cong \angle 2$	3. rt \angle s \Rightarrow \cong \angle s

a
a \rightarrow b
b \rightarrow c

7.



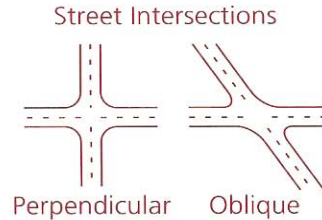
G: $\angle ACB = 90^\circ$
 $\overline{AD} \perp \overline{BD}$

P: $\angle C \cong \angle D$

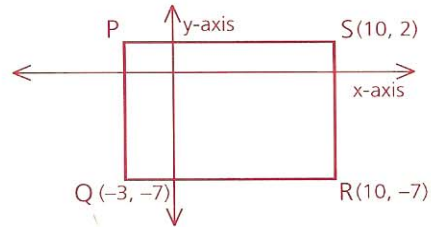
Statements	Reasons
1. $\angle ACB = 90^\circ$	1. Given
2. $\angle ACB$ rt \angle	2. $90^\circ \Rightarrow$ rt \angle (1)
3. $\overline{AD} \perp \overline{BD}$	3. Given
4. $\angle ADB$ rt \angle	4. $\perp \Rightarrow$ rt \angle (3)
5. $\angle C \cong \angle D$	5. rt \angle s \Rightarrow \cong \angle s (2+4)

- 9 You are the engineer for the development of a new subdivision in your town. When you design your street intersections, is it better to make the intersections perpendicular or oblique? Explain why.

Note When two lines intersect and are not perpendicular, they are called **oblique lines**.

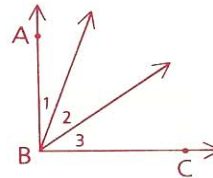


- 10 PQRS is a rectangle.
- Find the coordinates of point P.
 - Find the area of the rectangle.

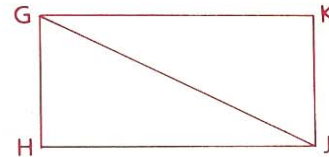


Problem Set B

- 11 $\overleftrightarrow{AB} \perp \overleftrightarrow{BC}$ and angles 1, 2, and 3 are in the ratio 1:2:3. Find the measure of each angle.

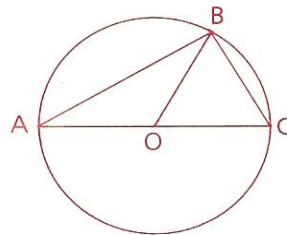


- 12 Line DE is perpendicular to line EF. The resulting angle is trisected, then one of the new angles is bisected, and then one of the resulting angles is trisected. How large is the smallest angle?
- 13 Given: $\angle HGJ = 37^\circ 20'$,
 $\angle KGJ = 52^\circ 40'$,
 $\overline{KJ} \perp \overline{HJ}$
- Conclusion: $\angle HGK \cong \angle HJK$ (Use a paragraph proof.)



Problem Set C

- 14 Given: $\overline{AB} \perp \overline{BC}$,
 $\angle ABO = (2x + y)^\circ$,
 $\angle OBC = (6x + 8)^\circ$,
 $\angle AOB = (23y + 90)^\circ$,
 $\angle BOC = (4x + 4)^\circ$
- Find: $m\angle ABO$

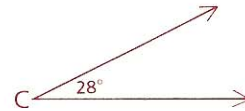
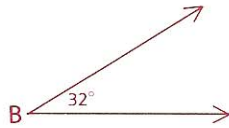
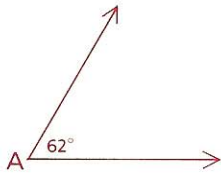


- 15 If a ray, \overrightarrow{BD} , is chosen at random between the sides of $\angle ABC$, where $m\angle ABC = 100$, what is the probability that
- $\angle ABD$ is acute?
 - $\angle DBC$ is acute?
 - Both $\angle ABD$ and $\angle DBC$ are acute?

Part Three: Problem Sets

Problem Set A

1 Which two angles are complementary?



Hint

2 What is the supplement of a 70° angle? $180 - 70 = 110^\circ$

3 $\angle 1$ is complementary to $\angle 3$. If $\angle 3 = y^\circ$, how large is $\angle 1$? $= (90 - y)^\circ$

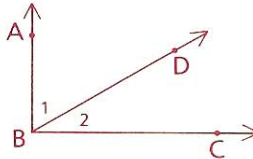
4 Find the complement of a $61^\circ 21' 13''$ angle.

5 One of two complementary angles is twice the other. Find the measures of the angles.

6 Copy the figure and the proof below. Then complete the proof by filling in the missing statements.

Given: $\angle 1$ is comp. to $\angle 2$.

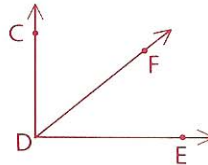
Prove: $\overleftrightarrow{AB} \perp \overleftrightarrow{BC}$



Statements	Reasons
1 _____	1 Given
2 _____	2 If a ray divides an \angle into two comp. \angle s, then the original \angle is a right \angle .
3 _____	3 If two lines intersect to form a right \angle , the two lines are \perp .

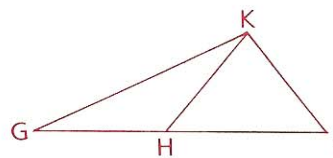
7 Given: $\overleftrightarrow{CD} \perp \overleftrightarrow{DE}$

Prove: $\angle CDF$ is comp. to $\angle FDE$. (Hint: This proof takes more than two steps.)



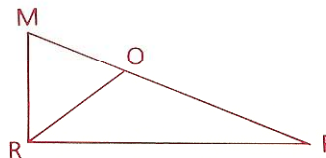
8 Given: Diagram as shown

Prove: $\angle GHK$ is supp. to $\angle KHJ$. (Hint: This proof takes more than two steps.)



9 Given: $\angle MRO$ is comp. to $\angle PRO$.

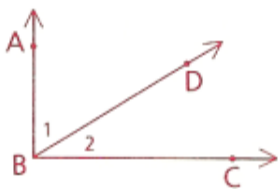
Prove: $\angle MRP$ is a right angle.



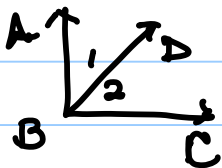
6 Copy the figure and the proof below. Then complete the proof by filling in the missing statements.

Given: $\angle 1$ is comp. to $\angle 2$.

Prove: $\overleftrightarrow{AB} \perp \overleftrightarrow{BC}$



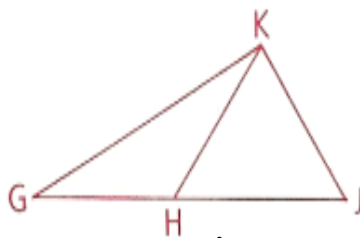
6. G: $\angle 1$ comp $\angle 2$
 P: $\overleftrightarrow{AB} \perp \overleftrightarrow{BC}$



Statements	Reasons
1. $\angle 1$ comp $\angle 2$	1. Given
2. $\angle ABC$ rt \angle	2. comp \angle s \Rightarrow rt \angle
3. $\overleftrightarrow{AB} \perp \overleftrightarrow{BC}$	3. rt $\angle \Rightarrow \perp$

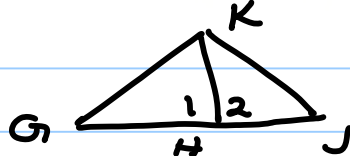
8 Given: Diagram as shown

Prove: $\angle GHK$ is supp. to $\angle KHJ$. (Hint: This proof takes more than two steps.)



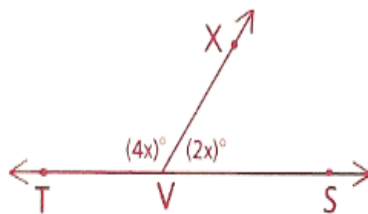
G: Diag

P: $\angle GHK$ supp $\angle KHJ$



Statements	Reasons
1. Diag	1. Given
2. $\angle GHJ$ st \angle	2. Diag \Rightarrow st \angle
3. $\angle 1$ supp $\angle 2$	3. st $\angle \Rightarrow$ supp \angle s

10 Find the measure of $\angle XVS$.



11 One of two supplementary angles is 70° greater than the second.
Find the measure of the larger angle.

Problem Set B

- 12 a Point P is reflected over the y -axis to point A . Find the coordinates of A .
- b Point P is reflected over the origin to point B . Find the coordinates of B .
- c If C is the midpoint of \overline{PA} , find the coordinates of C .

