

KEY

Geometry (H)

Section 2.2 – 2.5 w/ mixed review from Chapter 1 ~ Review

Write the list of terms that we have defined from chapter 1 and so far from chapter 2.

Write a list of postulates from chapter 1 and chapter 2

Write a list of all theorems we have discussed in chapter 2.

*You should have 8 theorems.
You need to know the statements, the givens,
the prove statements, and the diagrams,
as well as the proofs.*

We also studied the properties of equality and congruence. Write the key properties that we have used in our proofs.

Solve each of the following.

1. The measure of an angle is one-fifth the measure of its complement. Find the angle.

let x = the measure of complement
 $\frac{1}{5}x$ = the measure of angle
 $x + \frac{1}{5}x = 90$

$\frac{1}{5}x = 90$
 $x = 90 \left(\frac{5}{1}\right)$
 $x = 75$

$\text{Angle} = 15^\circ$

2. Four times the measure of the complement of an angle is 12 more than twice the difference of the measures of its supplement and its complement. Find the angle.

let x = the angle (measure)
 $90 - x$ = its complement (measure)
 $180 - x$ = its supplement (measure)

$4(90 - x) = 12 + 2[180 - x - (90 - x)]$
 $360 - 4x = 12 + 2(90)$
 $360 - 4x = 192$
 $168 = 4x$

$x = 42^\circ$
 $\text{Angle} = 42^\circ$

ck
 $42,$
 complement = 48 ✓
 supplement = 138 ✓
 $4(48) \stackrel{?}{=} 12 + 2(138 - 48)$
 $192 \stackrel{?}{=} 12 + 2(90)$
 $192 \stackrel{?}{=} 12 + 180$

3. The ratio of an angle to its supplement is 3 : 7. Find the ratio of the angle to its complement.

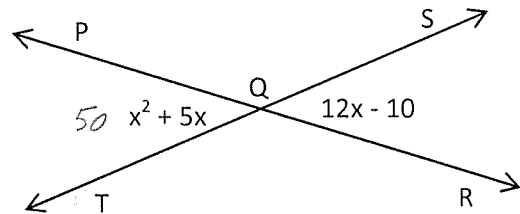
let $3x$ = measure of one \angle
 $7x$ = measure of other \angle
 $3x + 7x = 180$
 $10x = 180$
 $x = 18$

angle : complement
 $54 : 36$
 $3 : 2$
 ratio of angle : complement

54° , 126°
 angle, supplement

4. Find $m\angle TQR$.

$x^2 + 5x = 12x - 10$
 $x^2 - 7x + 10 = 0$
 $(x - 5)(x - 2) = 0$



$x = 5$ $x = 2$

$x^2 + 5x$	$x^2 + 5x$
$25 + 25$	$4 + 10$
50	14
<hr/>	<hr/>
$12x - 10$	$12x - 10$
$60 - 10 = 50$	$24 - 10$
	14

If $x = 5$, $m\angle TQR = 130$
 If $x = 2$, $m\angle TQR = 166$

5. Solve for x and y , then find $m\angle 1$, $m\angle 2$ and $m\angle 3$.

$$m\angle 1 = x - 7y$$

$$m\angle 2 = 5x - 3y + 90$$

$$m\angle 3 = 8x + 7$$

$$x - 7y = 8x + 7$$

$$x - 7y + 5x - 3y + 90 = 180$$

$$x - 7y = 8y + 7$$

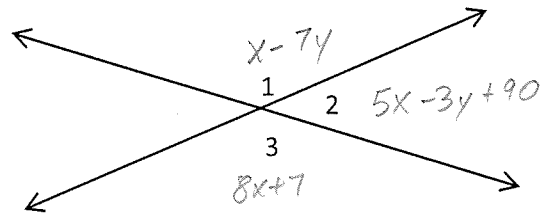
$$\rightarrow y = -x - 1$$

$$\rightarrow 6x - 10y = 90$$

$$6x - 10(-x - 1) = 90$$

$$x = 5$$

$$y = -6$$



$$m\angle 1 = 47$$

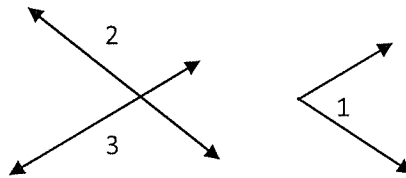
$$m\angle 2 = 133$$

$$m\angle 3 = 47$$

6. On a separate sheet of paper, write a flow proof for each of the following.

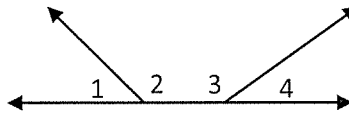
a. Given: $\angle 1 \cong \angle 2$

Prove: $\angle 1 \cong \angle 3$



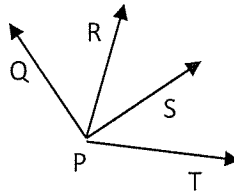
b. Given: $\angle 1 \cong \angle 4$

Prove: $\angle 2 \cong \angle 3$



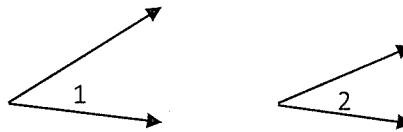
c. Given: \overline{PR} bisects $\angle QPS$
 \overline{PS} bisects $\angle RPT$

Prove: $\angle QPR \cong \angle SPT$



d. Given: $\angle 1$ complement $\angle 2$
 $m\angle 1 = 55^\circ$

Prove: $\angle 2 = 35^\circ$



PROOFS

* 99% of proofs - begin with "given"

6

a)

① $\angle 1 \cong \angle 2$ \longrightarrow ② $m\angle 1 = m\angle 2$

③ $\angle 2$ and $\angle 3$ are vertical \angle s. \longrightarrow ④ $\angle 2 \cong \angle 3$ \longrightarrow ⑤ $m\angle 2 = m\angle 3$

\longrightarrow ⑥ $m\angle 1 = m\angle 3$ \longrightarrow ⑦ $\angle 1 \cong \angle 3$

Reasons

① Given

② Def. of \cong angles

③ Def. of vertical \angle s

④ Vertical \angle s \cong .

⑤ Def. of \cong angles

⑥ Substitution

⑦ Def. of \cong angles

b)

① $\angle 1$ & $\angle 2$ form linear pair } \longrightarrow ② $\angle 1$ suppl. $\angle 2$
 $\angle 3$ & $\angle 4$ form linear pair } \longrightarrow ③ $\angle 3$ suppl. $\angle 4$

② $\angle 1$ suppl. $\angle 2$
③ $\angle 3$ suppl. $\angle 4$
③ $\angle 1 \cong \angle 4$ } \longrightarrow ④ $\angle 2 \cong \angle 3$

Reasons

① Def. of linear pair

② linear pair postulate

③ Given

④ Congruent supplements theorem

#6 Proofs

c)

$$\left. \begin{array}{l} \textcircled{1} \overline{PR} \text{ bisects } \angle QPS \\ \overline{PS} \text{ bisects } \angle RPT \end{array} \right\} \rightarrow \left. \begin{array}{l} \textcircled{2} \angle QPR \cong \angle RPS \\ \angle SPT \cong \angle RPS \end{array} \right\} \rightarrow \textcircled{3} \angle QPR \cong \angle SP$$

Reasons

① Given

② Def. of angle bisector

③ Transitive Property of Congruence of angles

d)

$$\left. \begin{array}{l} \textcircled{1} \angle 1 \text{ complements } \angle 2 \\ \textcircled{2} m\angle 1 + m\angle 2 = 90 \\ \textcircled{3} m\angle 1 = 55 \end{array} \right\} \rightarrow$$
$$\textcircled{4} 55 + m\angle 2 = 90 \rightarrow \textcircled{5} m\angle 2 = 35$$

Reasons

① Given

② Def. of complementary \angle s

③ Given

④ Substitution

⑤ Subtraction Property

7. Write a flow proof for each of the following statements. Provide a given, prove, diagram and flow proof.

If two angles are supplementary and congruent, then they form right angles.

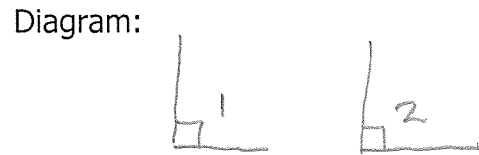
Given: $\angle 1$ Supple. $\angle 2$
 $\angle 1 \cong \angle 2$



Prove: $\angle 1$ & $\angle 2$ are right angles.

All right angles are congruent. *If angles are right, then they are \cong .*

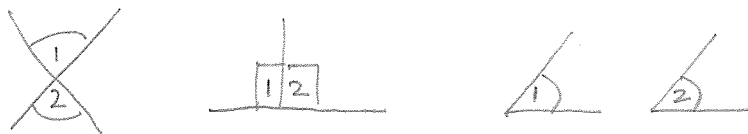
Given: $\angle 1$ and $\angle 2$ are right.



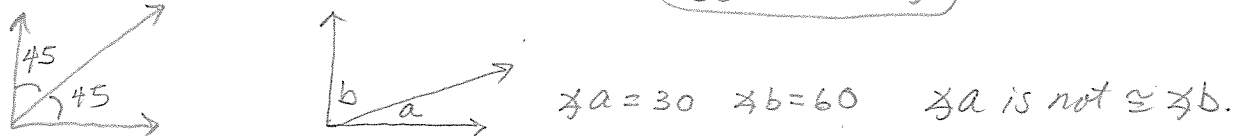
Prove: $\angle 1 \cong \angle 2$

8. Determine if the following statements are sometimes, always or never true. Justify your answer with a diagram/definition or theorem.

a. If $m\angle 1 = m\angle 2$, then $\angle 1$ and $\angle 2$ are vertical angles. Sometimes

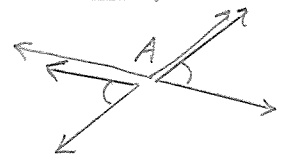


b. An angle and its complement are congruent. Sometimes



c. Two angles that are each supplementary to $\angle A$ are congruent. Always

Congruent Supplements Theorem



d. Supplementary angles form a linear pair. Always

Linear Pair Postulate

e. $\angle A$, $\angle B$ and $\angle C$ are complementary. Never

By definition of complementary angles, only 2 \angle s are complementary, not three.

⑦
TOP

$$\left. \begin{array}{l} \textcircled{1} \angle 1 \text{ suppl. } \angle 2 \rightarrow \textcircled{2} m\angle 1 + m\angle 2 = 180 \\ \textcircled{3} \angle 1 \cong \angle 2 \rightarrow \textcircled{4} m\angle 1 = m\angle 2 \end{array} \right\} \rightarrow \textcircled{5} \left. \begin{array}{l} m\angle 1 + m\angle 1 = 180 \\ m\angle 2 + m\angle 2 = 180 \end{array} \right\}$$

$$\left. \begin{array}{l} \textcircled{6} \left. \begin{array}{l} 2m\angle 1 = 180 \\ 2m\angle 2 = 180 \end{array} \right\} \rightarrow \textcircled{7} \left. \begin{array}{l} m\angle 1 = 90 \\ m\angle 2 = 90 \end{array} \right\} \rightarrow \textcircled{8} \angle 1 \text{ \& } \angle 2 \text{ are} \\ \text{Right angles.} \end{array} \right\}$$

Reasons

- | | |
|-----------------------------|-------------------------|
| ① Given | ⑤ Substitution |
| ② Def. of suppl. \angle s | ⑥ Distributive Property |
| ③ Given | ⑦ Division property |
| ④ Def of \cong angles. | ⑧ Def. of right angles |

BOTTOM If angles are right, then they are \cong .

$$\textcircled{1} \left. \begin{array}{l} \angle 1 \text{ and } \angle 2 \\ \text{are right angles.} \end{array} \right\} \rightarrow \textcircled{2} \left. \begin{array}{l} m\angle 1 = 90 \\ m\angle 2 = 90 \end{array} \right\} \rightarrow \textcircled{3} m\angle 1 = m\angle 2$$

$$\left. \begin{array}{l} \textcircled{3} m\angle 1 = m\angle 2 \\ \textcircled{4} \angle 1 \cong \angle 2 \end{array} \right\}$$

Reasons

- ① Given
- ② Def. of right \angle s.
- ③ Substitution
- ④ Def. of \cong angles.