

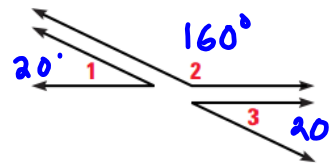
## 2.7 Prove Angle Pair Relationships

Goal: Use properties of special pairs of angles.

### Congruent Supplements Theorem - $180^\circ$

If 2 angles are supplementary to the same angle, then they are congruent

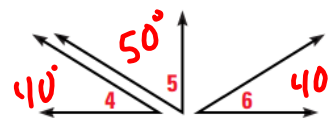
If  $\angle 1$  and  $\angle 2$  are supplementary and  $\angle 3$  and  $\angle 2$  are supplementary, then  $\angle 1 \cong \angle 3$ .



### Congruent Complements Theorem - $90^\circ$

If 2 angles are complementary to the same angle, then they are congruent

If  $\angle 4$  and  $\angle 5$  are complementary and  $\angle 6$  and  $\angle 5$  are complementary, then  $\angle 4 \cong \angle 6$ .

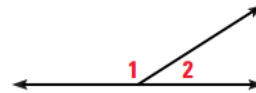


### Linear Pair Postulate

$180^\circ$

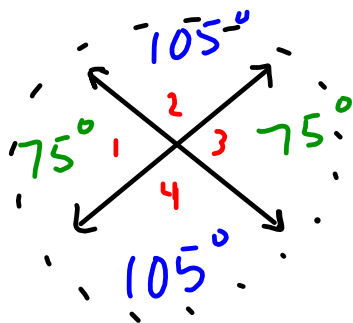
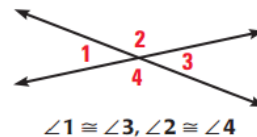
If 2 angles form a linear pair, then they are supplementary.

$\angle 1$  and  $\angle 2$  form a linear pair, so  $\angle 1$  and  $\angle 2$  are supplementary and  $m\angle 1 + m\angle 2 = 180^\circ$ .



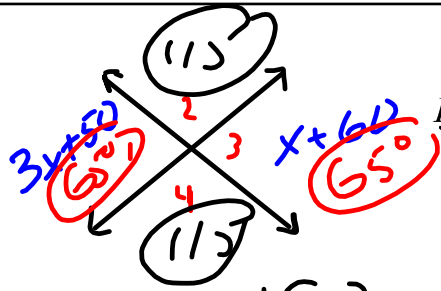
### Vertical Angles Theorem (VAT) -

vertical angles are congruent



If  $\angle 1 = 75^\circ$ , find  $\angle 2, \angle 3,$  and  $\angle 4$ .

$$\begin{array}{r} 180^\circ \\ - 75^\circ \\ \hline 105^\circ \end{array}$$

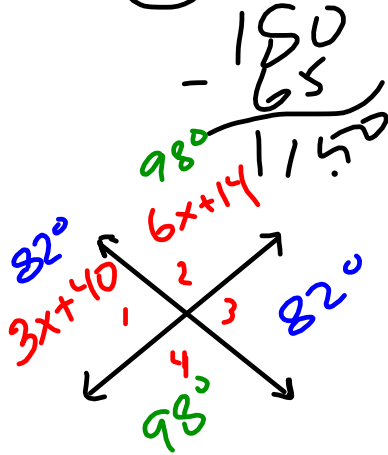


If  $\angle 1 = 3x + 50$ , and  $\angle 3 = x + 60$  find all angles.

$$3x + 50 = x + 60$$

$$2x = 10$$

$$x = 5$$



If  $\angle 1 = 3x + 40$ , and  $\angle 2 = 6x + 14$

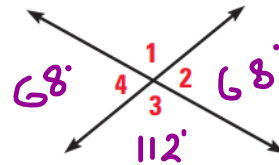
$$3x + 40 + 6x + 14 = 180$$

$$9x + 54 = 180$$

$$9x = 136$$

$$x = 14$$

If  $m\angle 1 = 112^\circ$ , find  $m\angle 2$ ,  $m\angle 3$ , and  $m\angle 4$ .



### Right Angles Congruence Theorem

All right angles are congruent.

#### PROOF

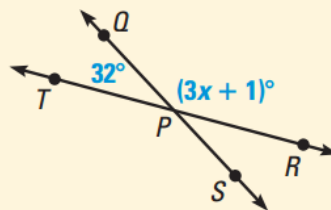
**GIVEN** ▶  $\angle 1$  and  $\angle 2$  are right angles.

**PROVE** ▶  $\angle 1 \cong \angle 2$



Which equation can be used to find  $x$ ?

- (A)  $32 + (3x + 1) = 90$
- (B)  $32 + (3x + 1) = 180$
- (C)  $32 = 3x + 1$
- (D)  $3x + 1 = 212$



Solve for  $x$ .

Find  $m\angle TPS$ .

HW: PG 119 #'s 2, 8-30