

KEY

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  
 $x + \frac{1}{5}x = 90$

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

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)

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

$x = 42^\circ$  Angle =  $42^\circ$

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

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  
 $54 : 36$

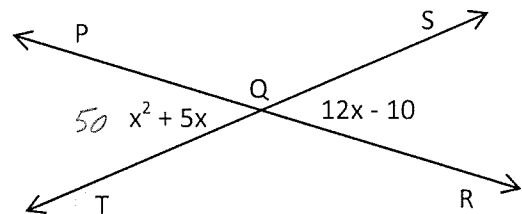
$3 : 2$

ratio of angle : complement

$54^\circ, 126^\circ$   
 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  $m\angle 3$ .

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

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

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

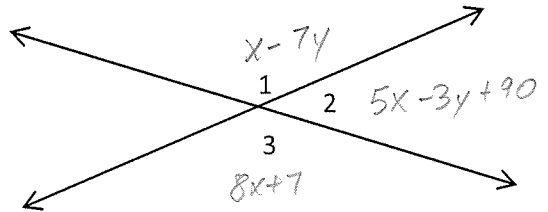
$$\begin{aligned} x - 7y &= 8x + 7 \\ x - 7y + 5x - 3y + 90 &= 180 \end{aligned}$$

$$\begin{aligned} x - 7y &= 8y + 7 \\ \rightarrow y &= -x - 1 \end{aligned}$$

$$\begin{aligned} \rightarrow 6x - 10y &= 90 \\ 6x - 10(-x - 1) &= 90 \end{aligned}$$

$$\begin{aligned} x &= 5 \\ y &= -6 \end{aligned}$$

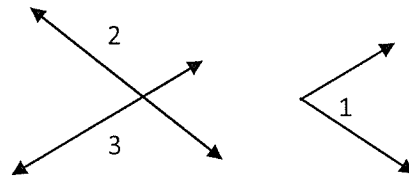
$$\begin{aligned} m\angle 1 &= 47 \\ m\angle 2 &= 133 \\ m\angle 3 &= 47 \end{aligned}$$



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

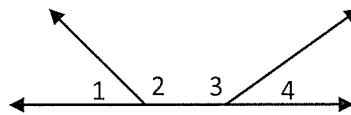
a. Given:  $\angle 1 \cong \angle 2$

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



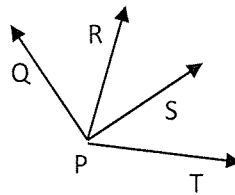
b. Given:  $\angle 1 \cong \angle 4$

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:  $\angle 2 = 35^\circ$

