

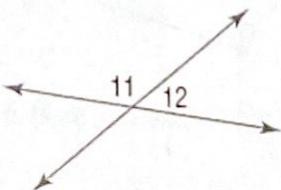
*Key*

Angle Relationships: Mixed Review Homework#2

Directions: Show your geometry and justifications and then solve.

1. Find  $m\angle 12$ .

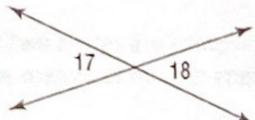
  
 $m\angle 11 = 4x$ ,  
 $m\angle 12 = 2x - 6$



$$\begin{aligned} \angle 11 + \angle 12 &= 180^\circ && \text{linear pairs are suppl.} \\ 4x + 2x - 6 &= 180 \\ 6x - 6 &= 180 \\ x &= 31 \end{aligned}$$

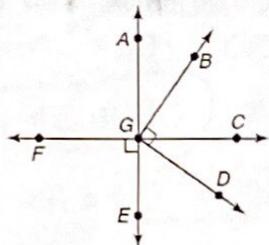
2. Find  $m\angle 17$ .

  
 $m\angle 17 = 2x + 7$ ,  
 $m\angle 18 = x + 30$



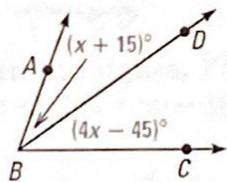
$$\begin{aligned} \angle 17 &\cong \angle 18 && \text{vertical } \angle \text{s are } \cong \\ 2x + 7 &= x + 30 \\ x &= 23 \\ m\angle 17 &= 2(23) + 7 \\ m\angle 17 &= 53^\circ \end{aligned}$$

3. If  $m\angle BGC = 16x - 4$ ,  $m\angle CGD = 2x + 13$ ,  $\overline{BG} \perp \overline{GD}$ , find  $x$ .



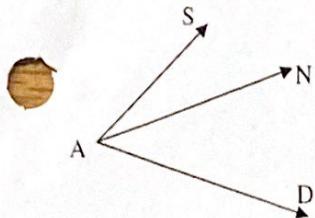
$$\begin{aligned} \angle BGD &= 90^\circ && \text{def of } \perp \\ \angle BGC + \angle CGD &= \angle BGD && \text{angle addition} \\ 16x - 4 + 2x + 13 &= 90 \\ 18x + 9 &= 90 \\ 18x &= 81 \\ x &= 4.5 \end{aligned}$$

4.  $\overrightarrow{BD}$  bisects  $\angle ABC$ . Find the value of  $x$ .



$$\begin{aligned} \angle ABD &\cong \angle DBC && \text{def of } \angle \text{ bisector} \\ x + 15 &= 4x - 45 \\ 60 &= 3x \\ 20 &= x \end{aligned}$$

5. Find x and the  $m\angle SAD$  if  $m\angle SAD = 16x - 2$ ,  $m\angle SAN = 9x - 7$ , and  $m\angle DAN = 3x + 17$ .



$$\angle SAN + \angle DAN = \angle SAD$$

$$9x - 7 + 3x + 17 = 16x - 2$$

$$12x + 10 = 16x - 2$$

$$12 = 4x$$

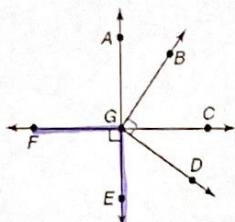
$$\boxed{3 = x}$$

angle addition

$$m\angle SAD = 16(3) - 2$$

$$\boxed{m\angle SAD = 46^\circ}$$

6. If  $m\angle FGE = 5x + 10$  and  $\overline{FC} \perp \overline{AE}$ , find x.



$$m\angle FGE = 90^\circ \text{ def of } \perp$$

$$5x + 10 = 90$$

$$5x = 80$$

$$\boxed{x = 16}$$

7. Two angles are complementary. The measure of one angle is 21 more than twice the measure of the other angle. Find the measures of both angles.

$$\angle A + \angle B = 90^\circ \text{ def of compl.}$$

$$\angle A = 2\angle B + 21$$

$$2\angle B + 21 + \angle B = 90$$

$$3\angle B + 21 = 90$$

$$3\angle B = 69$$

$$\boxed{\angle B = 23^\circ}$$

$23^\circ, 67^\circ$

$$\angle A = 2(23) + 21 \quad \boxed{\angle A = 67^\circ}$$

8. The measure of the supplement to  $\angle A$  is 60 less than three times the measure of the complement to  $\angle A$ .

$$\angle A + \underline{s} = 180^\circ \text{ def of Suppl.} \quad \underline{s} = 3\angle C - 60$$

$$\angle A + \underline{c} = 90^\circ \text{ def of compl.}$$

$$\angle A = \underline{90^\circ - \angle C}$$

$$\textcircled{1} \quad 90 - \angle C + 3\angle C - 60 = 180$$

$$2\angle C + 30 = 180$$

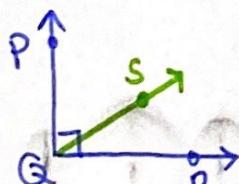
$$2\angle C = 150$$

$$\boxed{\angle C = 75^\circ}$$

$$\textcircled{2} \quad \underline{s} = 3(\underline{75}) - 60 \quad \boxed{\underline{s} = 165^\circ}$$

$$\textcircled{3} \quad \angle A + 75 = 90^\circ \quad \boxed{\angle A = 15^\circ}$$

9. Rays PQ and QR form a right angle. Point S lies in the interior of  $\angle PQR$ . If  $m\angle PQR = 4 + 7a$  and  $m\angle SQR = 9 + 4a$ , find the measures of  $\angle PQS$  and  $\angle SQR$ .



$$\angle PQR = 90^\circ \text{ def of RT \angle}$$

$$\angle PQS + \angle SQR = \angle PQR \text{ angle addition}$$

$$4 + 7a + 9 + 4a = 90$$

$$13 + 11a = 90$$

$$\boxed{a = 7}$$

$$\boxed{m\angle PQS = 53^\circ}$$

$$\boxed{m\angle SQR = 37^\circ}$$

10. In the figure,  $\overrightarrow{YX}$  and  $\overrightarrow{YZ}$  are opposite rays.  $\overrightarrow{YU}$  bisects  $\angle ZYW$ , and  $\overrightarrow{YT}$  bisects  $\angle XYW$ . If  $m\angle ZYU = 8p - 10$  and  $m\angle UYW = 10p - 20$ , find  $m\angle ZYU$ .

$$\angle ZYU \cong \angle UYW \text{ def of angle bisector}$$

$$8p - 10 = 10p - 20$$

$$10 = 2p$$

$$\boxed{5 = p}$$

$$m\angle ZYU = 8(5) - 10$$

$$\boxed{m\angle ZYU = 30^\circ}$$

