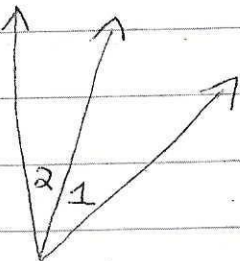


Name _____

Angle Pair Relationships

Adjacent Angles



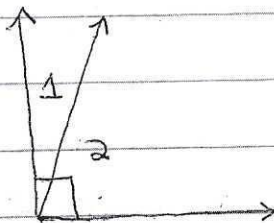
If $\angle 1 + \angle 2 = 80^\circ$

$m\angle 1 = 20^\circ$

then

$m\angle 2 = \boxed{60^\circ}$

Adjacent Angles Complementary Angles

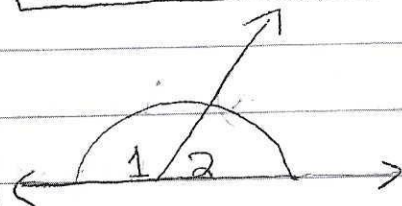


$\angle 1 + \angle 2 = 90^\circ$

If $m\angle 2 = 70^\circ$

then $m\angle 1 = \boxed{20^\circ}$

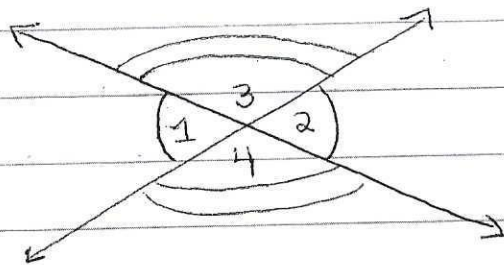
Adjacent Angles Supplementary Angles Linear Pair



$\angle 1 + \angle 2 = 180^\circ$

If $m\angle 1 = 110$

then $m\angle 2 = \boxed{70}$



$1^{st} \angle \cong 2^{nd} \angle$

\cong

Vertical Angles

$\angle 1$ and $\angle 2$

$\angle 3$ and $\angle 4$

$1^{st} \angle + 2^{nd} \angle = 180$

Supplementary

Adjacent Angles

$\angle 3$ and $\angle 2$

$\angle 1$ and $\angle 3$

$\angle 4$ and $\angle 1$

$\angle 4$ and $\angle 2$

If $m\angle 1 = 42$

then $m\angle 2 = 42$

$m\angle 3 = 138$

$m\angle 4 = 138$

Vertical Angles are Congruent

180

- 42

Vertical Angles are Congruent

138°

← Adjacent angles form a linear pair. They are supplementary.

ON BACK

Solving For A Missing Angle Using Algebra

1) Decide on the angle relationship

Either: Vertical Angles, Supplementary Angles, or Complementary Angle

2) Write an appropriate equation

Either: $1^{\text{st}} \text{ angle} = 2^{\text{nd}} \text{ angle}$

$$1^{\text{st}} \text{ angle} + 2^{\text{nd}} \text{ angle} = 180$$

$$1^{\text{st}} \text{ angle} + 2^{\text{nd}} \text{ angle} = 90$$

3) Solve the equation

4) Plug the value of the variable into the algebraic expression for the angle measure




5) Find the value of the remaining angles

Name Kay

Date _____

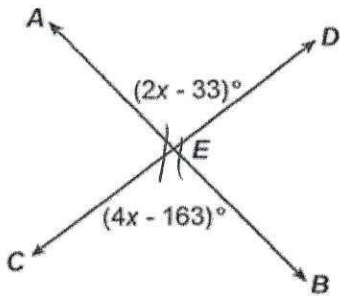
Mrs. Roubos

8R Period _____

+90°  +180°  = 
 Complementary, Supplementary & Vertical Angles

1) In the accompanying diagram, line \overline{AB} and line \overline{CD} intersect at point E. If $m\angle AED = (2x - 33)^\circ$ and $m\angle BEC = (4x - 163)^\circ$, find the value of x.

Vertical
Angles



$$2x - 33 = 4x - 163$$

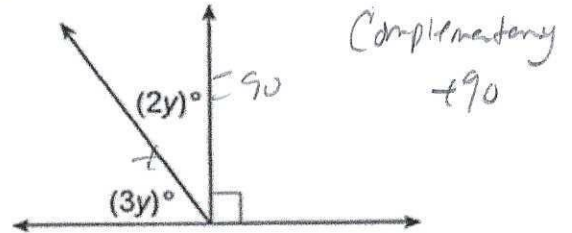
D
C
M
S

$$\begin{array}{r} -2x \quad -2x \\ \hline -33 = 2x - 163 \\ +163 \quad +163 \\ \hline \end{array}$$

$$\frac{130}{2} = \frac{2x}{2}$$

$$65 = x \text{ or } x = 65$$

2) Solve for y in the diagram below.



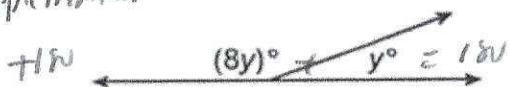
$$3y + 2y = 90$$

$$\frac{5y}{5} = \frac{90}{5}$$

$$y = 18$$

3) Solve for y in the diagram below.

Supplementary



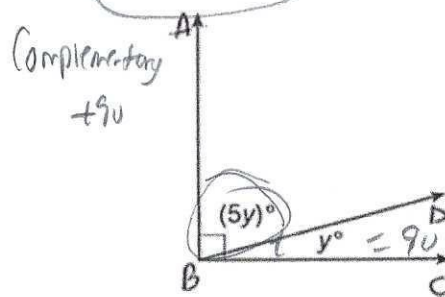
$$8y + y = 180$$

$$\frac{9y}{9} = \frac{180}{9}$$

$$y = 20$$

D
C
M
S

4) Solve for y in the diagram below. Then solve for the $m\angle ABD$.



$$5y + y = 90$$

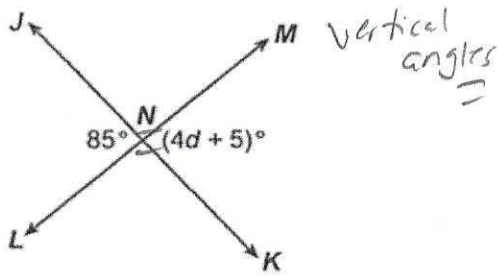
$$\frac{6y}{6} = \frac{90}{6}$$

$$y = 15$$

D
C
M
S

$$\begin{array}{l} m\angle ABD = 5y \\ m\angle ABD = 5(15) \\ m\angle ABD = 75^\circ \end{array}$$

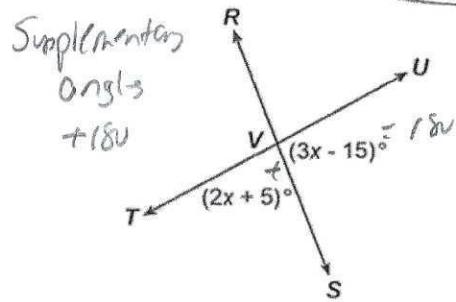
5) In the accompanying diagram, line \overline{JK} and line \overline{LM} intersect at point N. If $m\angle MNK = (4d+5)^\circ$ and $m\angle JNL = 85^\circ$, find the value of d.



$$\begin{aligned} 85 &= 4d + 5 \\ -5 &\quad -5 \\ \hline 80 &= 4d \\ \frac{80}{4} &\quad \frac{4d}{4} \\ 20 &= d \\ \text{or} \\ d &= 20 \end{aligned}$$

D
C
M
S

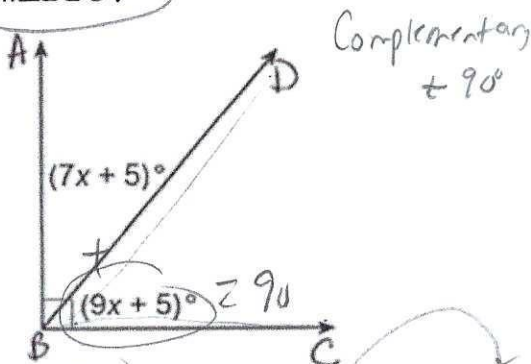
6) In the accompanying diagram, line \overline{RS} and line \overline{TU} intersect at point V. If $m\angle TVS = (2x+5)^\circ$ and $m\angle SVU = (3x-15)^\circ$, find the value of x.



$$\begin{aligned} (2x) + 5 + (3x) - 15 &= 180 \\ 5x - 10 &= 180 \\ +10 &\quad +10 \\ \hline 5x &= 190 \\ \frac{5x}{5} &\quad \frac{190}{5} \\ x &= 38 \end{aligned}$$

D
C
M
S

7) Solve for x in the diagram below. Then solve for the $m\angle DBC$.

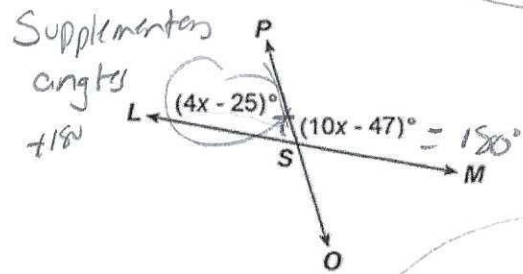


$$\begin{aligned} (7x) + 5 + (9x) + 5 &= 90 \\ 16x + 10 &= 90 \\ -10 &\quad -10 \\ \hline 16x &= 80 \\ \frac{16x}{16} &\quad \frac{80}{16} \\ x &= 5 \end{aligned}$$

$$\begin{aligned} m\angle DBC &= 9x + 5 \\ m\angle DBC &= 9(5) + 5 \\ m\angle DBC &= 45 + 5 \\ m\angle DBC &= 50^\circ \end{aligned}$$

D
C
M
S

8) In the accompanying diagram, line \overline{LM} and line \overline{OP} intersect at point S. If $m\angle LSP = (4x-25)^\circ$ and $m\angle PSM = (10x-47)^\circ$, find the $m\angle LSP$.



$$\begin{aligned} (4x) - 25 + (10x) - 47 &= 180 \\ 14x - 72 &= 180 \\ +72 &\quad +72 \\ \hline 14x &= 252 \\ \frac{14x}{14} &\quad \frac{252}{14} \\ x &= 18 \end{aligned}$$

$$\begin{aligned} m\angle LSP &= 4x - 25 \\ m\angle LSP &= 4(18) - 25 \\ m\angle LSP &= 72 - 25 \\ m\angle LSP &= 47^\circ \end{aligned}$$

D
C
M
S