

Name: \_\_\_\_\_ Date: \_\_\_\_\_

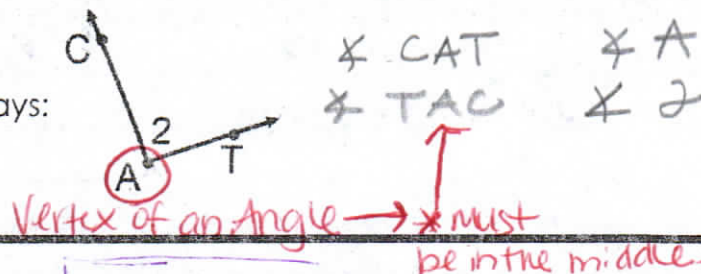
**Complementary, Supplementary, Linear Pairs & Vertical Angles****Geometry Symbols:**

- Angle  $\angle$  OR  $\sphericalangle$
- Degree  $^\circ$  or  $60^\circ$
- Right Angle  $\square$  or  $rt \angle$
- Perpendicular  $\perp$

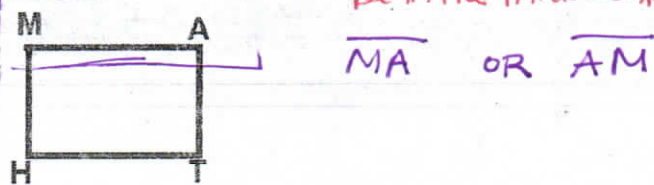
- Segment AB  $\overline{AB}$
- Ray CD  $\overrightarrow{CD}$
- Line EF  $\overleftrightarrow{EF}$
- Measure  $m \angle$

**Naming Angles:**

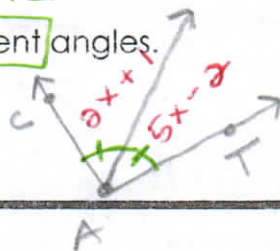
- Name this angle 4 different ways:

**Naming Segments**

- What is the name of the top side:

**Angle Bisector**

- Cuts an angle into TWO congruent angles.
- Example: Solve for x:

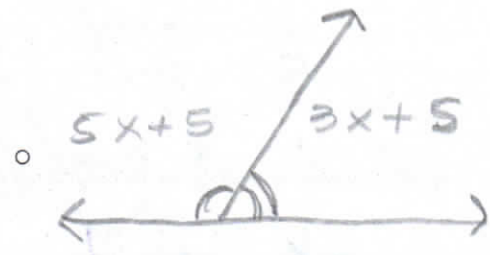
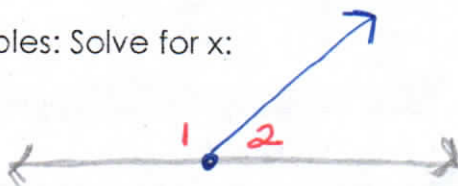


$$\begin{aligned}
 2x+1 &= 5x-2 \\
 -2x &\quad -2x \\
 1 &= 3x-2 \\
 +2 &\quad +2 \\
 3 &= 3x \quad \boxed{x=1}
 \end{aligned}$$

**Linear Pair (Supplementary)**

- Two angles that are side-by-side, share a common vertex, share a common ray, & create a straight line.
- EQUATION:  $m\angle 1 + m\angle 2 = 180^\circ$

- Examples: Solve for x:



$$5x+5 + 3x+5 = 180$$

$$8x+10 = 180$$

$$8x = 170$$

$$\boxed{x=21.25}$$

**Supplementary Angles**

- Two angles that add up to  $180^\circ$ .

EQUATION:  $m\angle 1 + m\angle 2 = 180^\circ$

- Examples: Solve for x:

- $\angle x$  and  $\angle y$  are supplementary angles.  $m\angle x = 47^\circ$ . Find  $m\angle y$ .

$$m\angle x + m\angle y = 180^\circ$$

$$47 + m\angle y = 180^\circ$$

$$m\angle y = 133^\circ$$

- One of two supplementary angles is 46 degrees more than its supplement. Find the measure of both angles.

$$m\angle 1 + m\angle 2 = 180$$

$$m\angle 1 = x = 67$$

$$m\angle 2 = x + 46 = 113$$

$$x + x + 46 = 180$$

$$2x = 134$$

$$x = 67^\circ$$

**Complementary Angles**

- Two angles that add up to  $90^\circ$ .

$\perp$  or  $L$

- Examples: Solve for x:



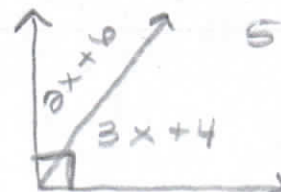
- EQUATION:  $m\angle 1 + m\angle 2 = 90^\circ$

$$2x + 6 + 3x + 4 = 90$$

$$5x + 10 = 90$$

$$5x = 80$$

$$x = 16$$



- One of two complementary angles is 16 degrees less than its complement. Find the measure of both angles.

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

$$m\angle 1 = x$$

$$m\angle 2 = x - 16$$

$$x + x - 16 = 90$$

$$2x = 106$$

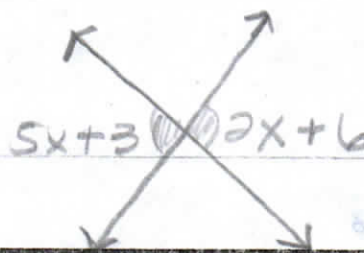
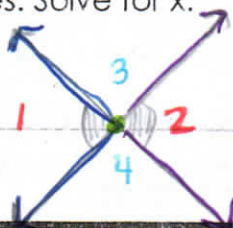
$$x = 53$$

**Vertical Angles (congruent)**

- 2 angles that share a common vertex & their sides form two pairs of opposite rays.

- EQUATION:  $m\angle 1 = m\angle 2$

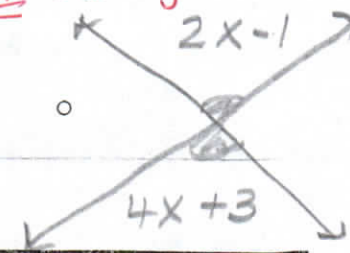
- Examples: Solve for x:



$$5x + 3 = 2x + 6$$

$$3x = 3$$

$$x = 1$$



$$4x + 3 = 2x - 1$$

$$2x = -4$$

$$x = -2$$

$$m\angle 3 = m\angle 4 \text{ vertical angles}$$

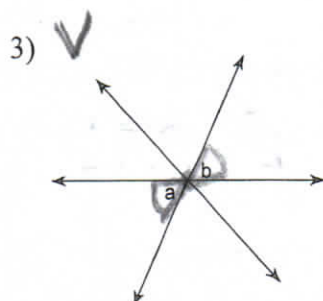
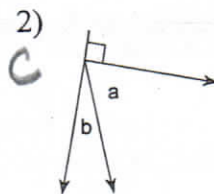
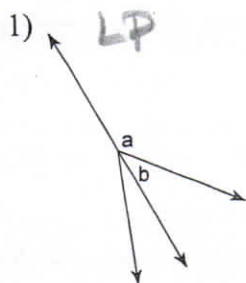
$$m\angle 1 + m\angle 3 = 180^\circ \text{ b/c linear pairs Adjacent Supplementary}$$

\* X CAN be Neg.  
IF the angle is not \*

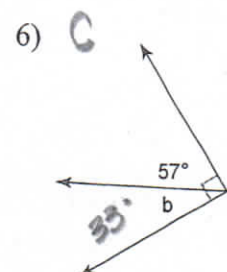
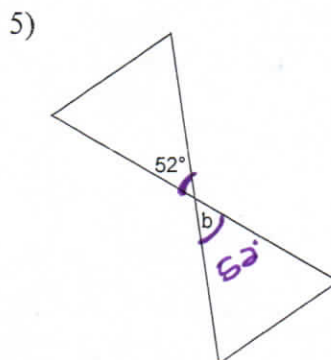
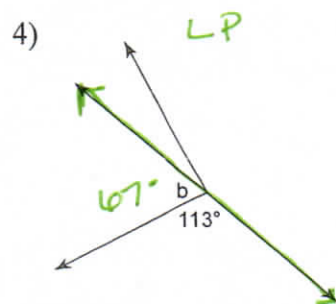
# Intro to Angle Relationships

Date \_\_\_\_\_ Period \_\_\_\_\_

Name the relationship: complementary, linear pair, or vertical.

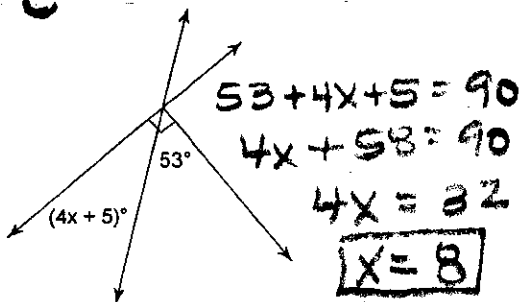


Find the measure of angle b.

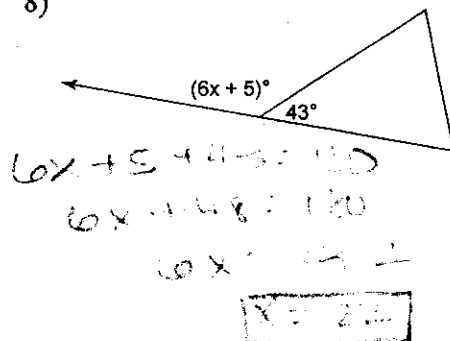


Find the value of x.

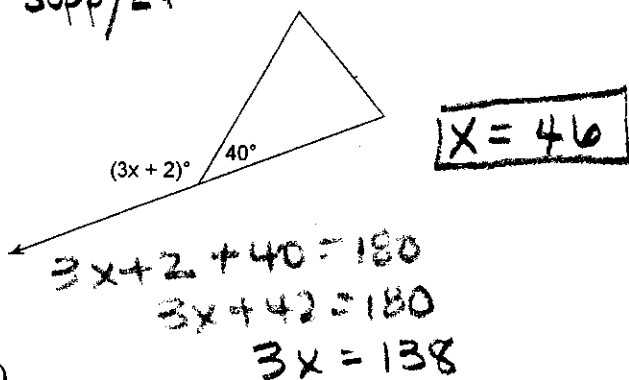
7) C



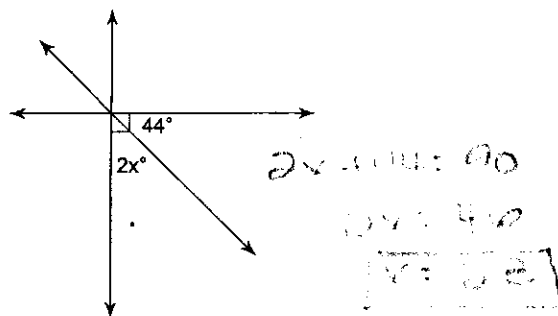
8)



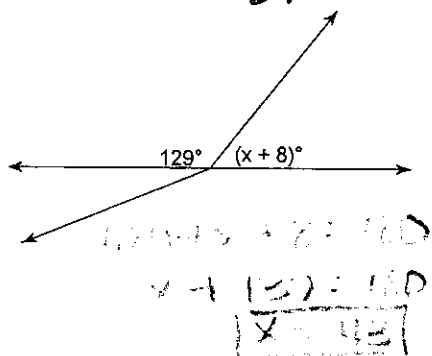
9) Supp/LP



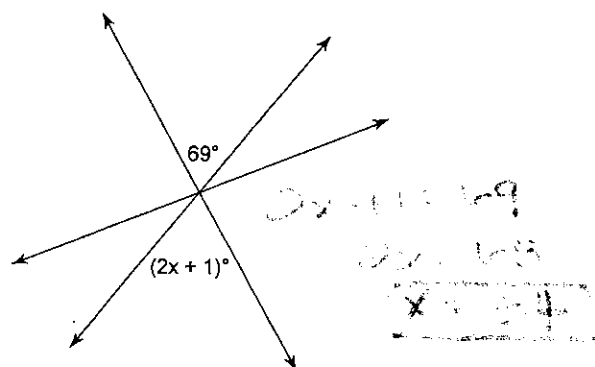
10)



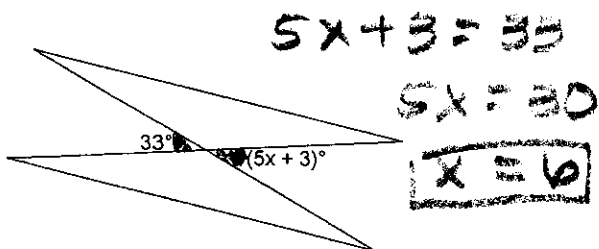
11)



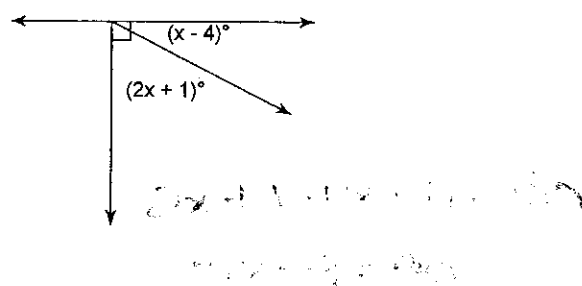
12)



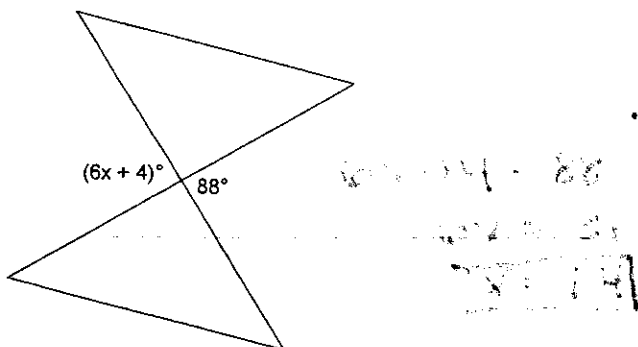
13)



14)



15)

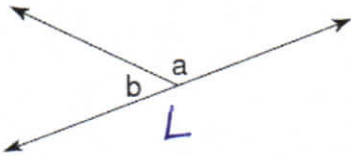




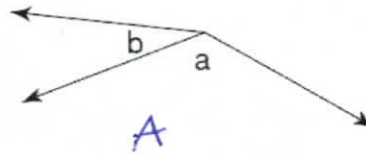
Name: \_\_\_\_\_ Date: \_\_\_\_\_

Name the angle relationship: linear pair, vertical angles, or adjacent.

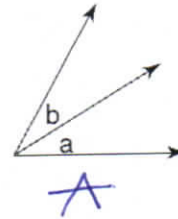
1.



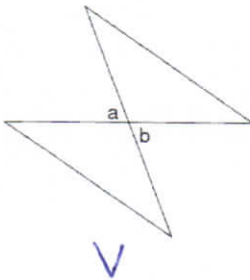
2.



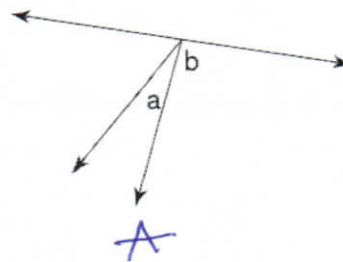
3.



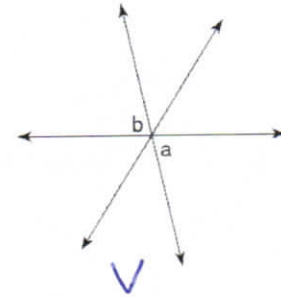
4.



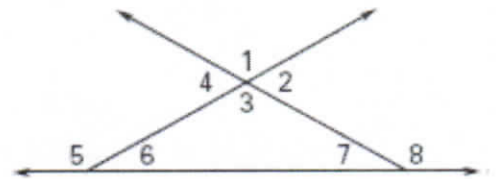
5.



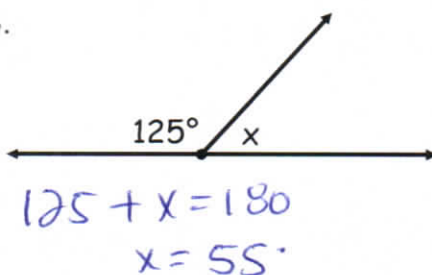
6.



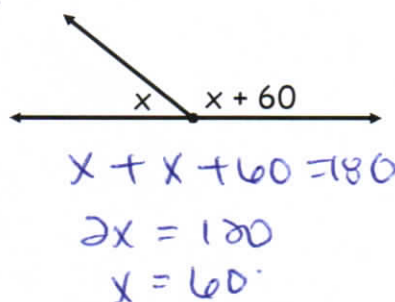
Use the diagram to tell whether the angles are vertical angles, a linear pair, or neither.

7.  $\angle 1$  and  $\angle 2$  L 8.  $\angle 1$  and  $\angle 3$  V9.  $\angle 1$  and  $\angle 4$  L 10.  $\angle 1$  and  $\angle 5$  N11.  $\angle 1$  and  $\angle 6$  N 12.  $\angle 1$  and  $\angle 7$  N13.  $\angle 1$  and  $\angle 8$  N 14.  $\angle 2$  and  $\angle 4$  VSolve for  $x$ .

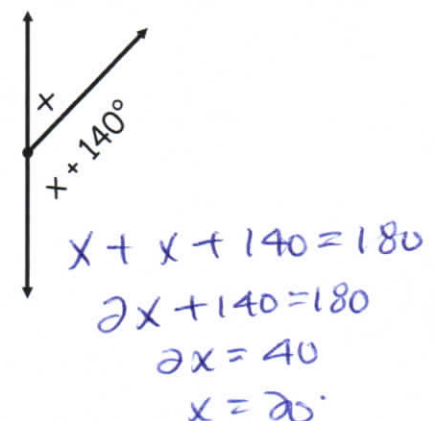
15.



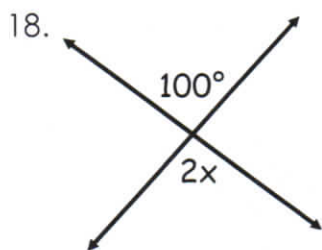
16.



17.

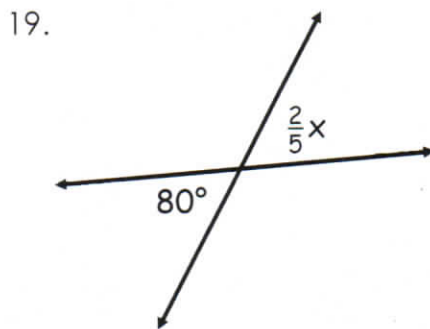


Solve for x.



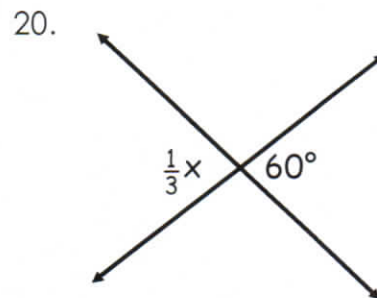
$$2x = 100$$

$$x = 50^\circ$$



$$\frac{2}{5}x = 80$$

$$x = 200^\circ$$

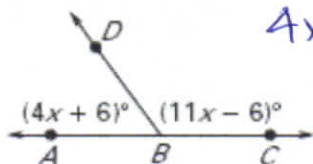


$$\frac{1}{3}x = 60$$

$$x = 180^\circ$$

Use the diagram to find the indicated measure.

21.  $x = 12^\circ$   
 $m\angle ABD = 54^\circ$   
 $m\angle DBC = 126^\circ$



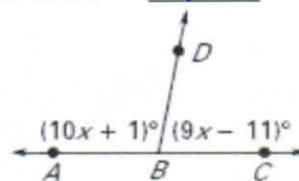
$$4(12) + 6$$

$$4x + 6 + 11x - 6 = 180$$

$$15x = 180$$

$$x = 12^\circ$$

22.  $x = 10$   
 $m\angle ABD = 101^\circ$   
 $m\angle DBC = 79^\circ$



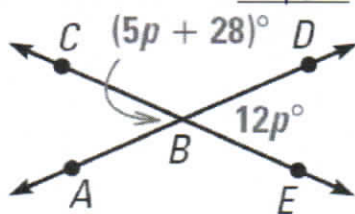
$$10x + 1 + 9x - 11 = 180$$

$$19x - 10 = 180$$

$$19x = 190$$

$$x = 10$$

23.  $x = 4$   
 $m\angle ABC = 48^\circ$   
 $m\angle DBE = 48^\circ$



$$5p + 28 = 12p$$

$$28 = 7p$$

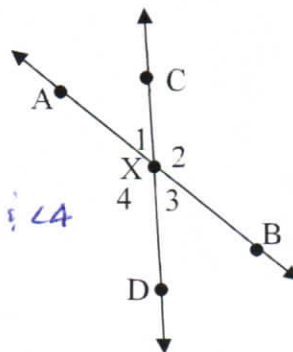
$$4 = p$$

Name: Walsh-Keay

Date: \_\_\_\_\_

**Supplementary and Complementary Angles Homework****Name the figures described. Use the figure for 1-6.**

- Two acute angles.  $\angle 1, \angle 3$
- Two obtuse angles.  $\angle 2, \angle 4$
- Two pairs of vertical angles.  $\angle 1, \angle 3$   $\angle 4, \angle 2$
- Four pairs of adjacent angles.  $\angle 1, \angle 2, \angle 1, \angle 4, \angle 2, \angle 3, \angle 3, \angle 4$
- Four pairs of supplementary angles. same  $\uparrow$
- Two supplements of  $\angle AXC$ .  $\angle 2$  and  $\angle 4$



- Suppose  $\angle 1$  and  $\angle 2$  are known to be complementary. If  $m\angle 1 = 20^\circ$ , then  $m\angle 2 =$  $70^\circ$ .
- Suppose  $\angle 3$  and  $\angle 4$  are known to be supplementary. If  $m\angle 3 = 40^\circ$ , then  $m\angle 4 =$  $140^\circ$ .

**For problems 9-12, if  $\angle 1$  and  $\angle 2$  are complementary angles, state the numerical value of  $x$ .**

9. $m\angle 1 = 2x, m\angle 2 = 3x$ $2x + 3x = 90$ $5x = 90$ $x = 18$	10. $m\angle 1 = x, m\angle 2 = x + 20$ $x + x + 20 = 90$ $2x = 70$ $x = 35$
11. $m\angle 1 = 2m\angle 2, m\angle 2 = x$ $2m\angle 2 + x = 90$ $2x + x = 90$ $3x = 90$ $x = 30$	12. $m\angle 1 = 30 + x, m\angle 2 = 40 + x$ $30 + x + 40 + x = 90$ $2x + 70 = 90$ $2x = 20$ $x = 10$

**For problems 13-16, if  $\angle 3$  and  $\angle 4$  are supplementary angles, state the numerical value of  $y$ .**

13. $m\angle 3 = 2y, m\angle 4 = 3y - 15$ $2y + 3y - 15 = 180$ $5y = 195$ $y = 39$	14. $m\angle 3 = y + 10, m\angle 4 = 3y - 10$ $y + 10 + 3y - 10 = 180$ $4y = 180$ $y = 45$
15. $m\angle 3 = 5m\angle 4, m\angle 4 = y$ $5m\angle 4 + y = 180$ $5y + y = 180$ $6y = 180$ $y = 30$	16. $m\angle 3 = 160 - y, m\angle 4 = 170 - y$ $160 - y + 170 - y = 180$ $330 - 2y = 180$ $-2y = -150$ $y = 75$

17. Two angles are supplementary. The measure of one is five times the measure of the other angle. Find each angle. \_\_\_\_\_

$$\begin{aligned} m\angle 1 &= 5m\angle 2 & m\angle 2 &= x \\ 5x + x &= 180 & m\angle 1 &= 150 \\ 6x &= 180 & m\angle 2 &= 30 \\ x &= 30 \end{aligned}$$

18. Two angles are complementary. The measure of one is  $\frac{4}{5}$  the measure of the other. Find each angle. \_\_\_\_\_

$$\begin{aligned} m\angle 1 &= \frac{4}{5}m\angle 2 & m\angle 2 &= x \\ \frac{4}{5}x + x &= 90 & m\angle 1 &= 40 \\ \frac{9}{5}x &= 90 & m\angle 2 &= 50 \\ x &= 50 \end{aligned}$$

Solve.

$m\angle 1 = 40^\circ$   
 $m\angle 2 = 30^\circ$  19. The measure of an angle is 30 more than its complement. Find the measure of the angle and its complement.

$$\begin{aligned} m\angle 1 &= 30 + m\angle 2 & m\angle 2 &= x \\ 30 + x + x &= 90 & 2x &= 60 \\ x &= 30 \end{aligned}$$

$45^\circ$  20. The measure of an angle is the same as the measure of its complement. Find the measure of the angle.

$$\begin{aligned} m\angle 1 &= m\angle 2 & m\angle 2 &= x \\ x + x &= 90 \end{aligned}$$

$m\angle 1 = 80^\circ$   
 $m\angle 2 = 100^\circ$   
complement =  $10^\circ$  21. The measure of an angle is 20 less than the measure of its supplement. Find the measure of the angle, the measure of its supplement, and the measure of its complement.

$$\begin{aligned} m\angle 1 &= -20 + m\angle 2 & m\angle 2 &= x \\ -20 + x + x &= 180 & 2x &= 200 \\ -20 + 2x &= 180 & x &= 100 \end{aligned}$$

$m\angle 1 = 120^\circ$   
 $m\angle 2 = 60^\circ$  22. The measure of an angle is twice that of its supplement. Find the measure of the angle and its supplement.

$$\begin{aligned} m\angle 1 &= 2m\angle 2 & m\angle 2 &= x \\ 2x + x &= 180 & x &= 60 \\ 3x &= 180 \end{aligned}$$

$m\angle D = 45^\circ$   
 $m\angle E = 135^\circ$   
complement =  $45^\circ$  23.  $\angle D$  and  $\angle E$  form a linear pair and  $m\angle E = 3m\angle D$ . Find the measure of each angle and the measure of the complement of  $\angle D$ .

$$\begin{aligned} 3x + x &= 180 & x &= 45 \\ 4x &= 180 \end{aligned}$$

24. Find all the missing angles given  $m\angle 1 = 90^\circ$ ,  $m\angle 2 = 34^\circ$ , and  $m\angle 6 = 137^\circ$ .

$m\angle 3 = 90^\circ$

$m\angle 4 = 146^\circ$

$m\angle 5 = 146^\circ$

$m\angle 7 = 137^\circ$

$m\angle 8 = 43^\circ$

