Name: __key__
Date: _____ Period: ___

1. Find $m\angle ABC$ and $m\angle CBD$.

2. Find $m\angle EFH$ and $m\angle HFG$.

$5x - 10 = 90$ $m\angle ABC = 40°$
$5x = 100$ $m\angle CBD = 50°$
$x = 20$
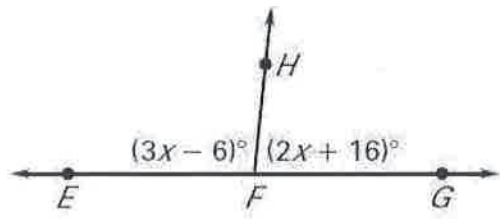
$5x + 10 = 180$ $m\angle EFH = 96°$
$5x = 170$ $m\angle HFG = 84°$
$x = 34$

3. The measure of one angle is three times the measure of its complement. Find the measure of each angle.

$x = 3(90 - x)$
$x = 270 - 3x$
$4x = 270 \Rightarrow x = 67.5$

one angle: $67.5°$ } these need
other: $22.5°$ } to sum to $90°$

4. An angle is 24 degrees less than twice the measure of its supplement. Find the measure of each angle.

$x = 2(180 - x) - 24$
$x = 360 - 2x - 24$
$3x = 336$
$x = 112°$

one angle = $112°$ } these need to
other = $68°$ } sum to $180°$

5. The supplement of an angle is 6 more than 8 times the complement of the angle. Find the measure of each angle.

$180 - x = 6 + 8(90 - x)$
$180 - x = 6 + 720 - 8x$
$180 - x = 726 - 8x$
$180 + 7x = 726$

$7x = 546$
$x = 78$

one angle = $78°$

comp = $12°$
supp = $102°$

6. Use the diagram to the right:

$180 - 28 - 56$

a. Find $m\angle KPL$ __96°__

b. Find $m\angle LPN$ __84°__

c. Find $m\angle MPN$ __28°__

d. Find $m\angle MPO$ __124°__

Solve for x and y.

7.

$$97$$
$$(9x+2)° \quad (10x+7)°$$
$$(18y+25)°$$
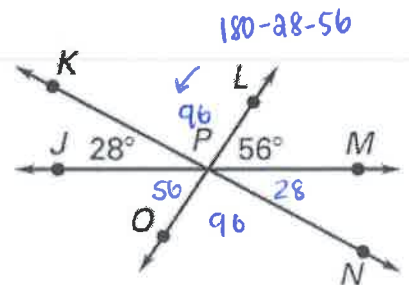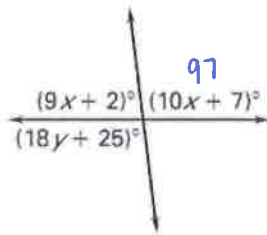
$$19x+9=180 \qquad 18y+25=97$$
$$19x=171 \qquad\qquad 18y=72$$
$$\boxed{x=9} \qquad\qquad \boxed{y=4}$$

8.

$$117$$
$$7x° \quad 13y°$$
$$(16y-27)° \quad (5x+18)°$$
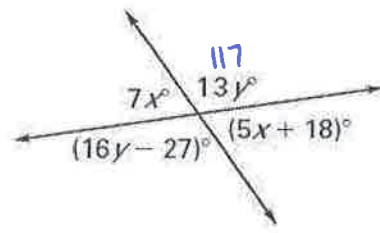
$$13y=16y-27 \qquad 7x+117=180$$
$$-3y=-27 \qquad\qquad 7x=63$$
$$\boxed{y=9} \qquad\qquad \boxed{x=9}$$

Please find the values of x and y and then find all angle measures.

9.

A   55°   B
             (y+20)°
125° (4y-15)°   (3x+5)° 125°
D   E
      (x+15)°
               C
         55°

$$4x+20=180 \qquad y+20=55$$
$$4x=160 \qquad\qquad \boxed{y=35}$$
$$\boxed{x=40}$$

10.

$$140°$$
$$2(5x-5)°$$
$$(5y+5)° \quad (7y-9)°$$
$$40° \qquad\qquad 40°$$
$$(6x+50)°$$
$$140°$$
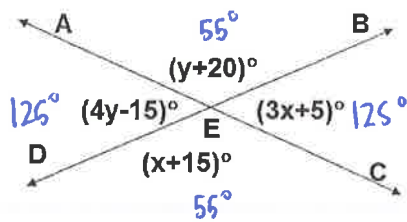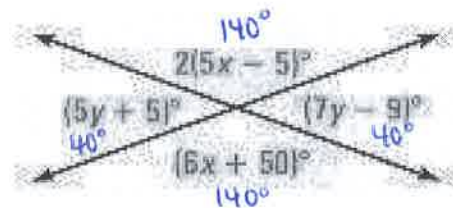
$$5y+5=7y-9 \qquad 2(5x-5)=6x+50$$
$$5=2y-9 \qquad\qquad 10x-10=6x+50$$
$$14=2y \qquad\qquad 4x=60$$
$$\boxed{y=7} \qquad\qquad \boxed{x=15}$$

11. Point B is in the interior of $\angle CAT$. If $m\angle CAB = (3x-16)°$, $m\angle BAT = (7x-8)°$, and $m\angle CAT = (3x+60)°$, please find the measures of all three angles.
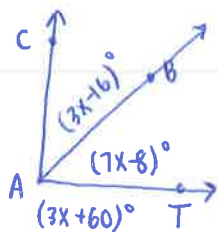
C
(3x-16)°   B
(7x-8)°
A
(3x+60)°   T

$$10x-24=3x+60 \qquad m\angle CAB = 20°$$
$$7x=84 \qquad\qquad m\angle BAT = 76°$$
$$\boxed{x=12} \qquad\qquad m\angle CAT = 96°$$

12. $\angle A$ and $\angle B$ are complementary angles. If $m\angle A = (2x^2+35)°$ and $m\angle B = (x+10)°$, then what are the possible measures of both angles?

$$-90 < \frac{10}{-9}$$

$$2x^2+35+x+10=90$$
$$2x^2+x+45=90$$
$$2x^2+x-45=0$$
$$2x^2+10x-9x-45=0$$
$$2x(x+5)-9(x+5)=0$$
$$(2x-9)(x+5)=0$$
$$\boxed{x=4.5, \ x=-5}$$
↳ both x-values work

$$\boxed{m\angle A = 75.5°, \quad m\angle B = 14.5°} \leftarrow \text{when } x=4.5$$
$$m\angle A = 85°, \quad m\angle B = 5° \qquad \leftarrow \text{when } x=-5$$

13. Given that $\angle A$ and $\angle B$ are supplementary angles, and $m\angle A = \left(\frac{3}{8}x+50\right)^\circ$ and $m\angle B = (x+31)^\circ$

find $m\angle A$ and $m\angle B$.

$\frac{3}{8}X+50+X+31 = 180$

$\frac{11}{8}X+81 = 180$

$\frac{11}{8}X = 99$

$\boxed{X=72}$

$\boxed{\begin{array}{l} m\angle A = 77^\circ \\ m\angle B = 103^\circ \end{array}}$

14. $\overrightarrow{BD}$ bisects $\angle ABC$. Please find $m\angle ABD$, $m\angle DBC$, and $m\angle ABC$.

$X^2+3X-40 = 2X+16$ $m\angle ABD = 30^\circ$

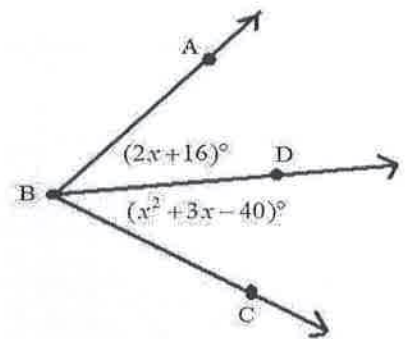$X^2+X-56 = 0$

$(X+8)(X-7) = 0$ $m\angle DBC = 30^\circ$

$X \cancel{=-8}, \boxed{X=7}$

$\uparrow$ $m\angle ABC = 60^\circ$

doesnt work because

$2(-8)+16 = 0$ (angles canthave 0°)

15. Let Q be in the interior of $\angle POR$. Use the angle addition postulate to solve for x and find the measure of each angle.
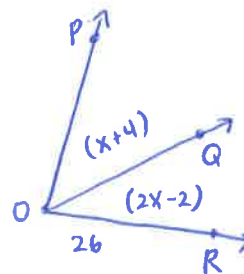
$m\angle POQ = (x+4)^\circ = 12^\circ$

$m\angle QOR = (2x-2)^\circ = 14^\circ$

$m\angle POR = 26^\circ$

$X+4+2X-2 = 26$

$3X+2 = 26$

$3X = 24 \Rightarrow \boxed{X=8}$

16. Draw a sketch where:
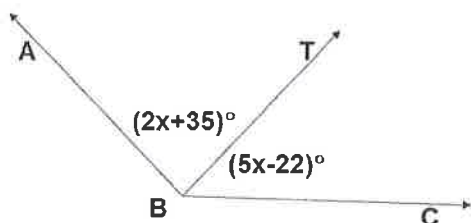
D is in the interior of $\angle BAE$, E is in the interior of $\angle DAF$, F is in the interior of $\angle EAC$

$m\angle BAC = 130^\circ$, $m\angle EAC = 100^\circ$, $m\angle BAD = m\angle EAF = m\angle FAC$

Then please find $m\angle BAE$.

SKIP this one ☺

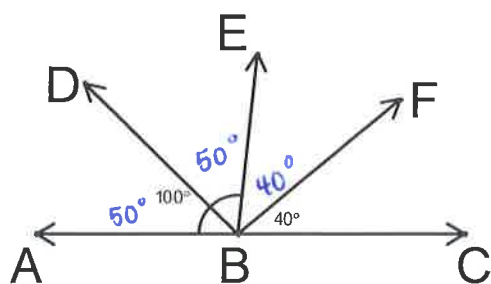17. Given $\overrightarrow{BT}$ bisects $\angle ABC$. Find the value of x.

$2x+35=5x-22$

$35=3x-22$

$3x=57$

$\boxed{x=19}$

18. $\overrightarrow{BD}$ bisects $\angle ABE$ and $\overrightarrow{BF}$ bisects $\angle EBC$. Please find $m\angle DBF$.

$m\angle DBF = 50+40 = \boxed{90°}$

19. $\angle 1$ is supplementary to $\angle 2$ and $\angle 2$ is supplementary to $\angle 3$. If $m\angle 1 = (5x-48)°$ and $m\angle 3 = (2x+30)°$. Please find $m\angle 2$.

$\angle 1 + \angle 2 = 180$ $\angle 2 + \angle 3 = 180$

$5x-48+y=180$ $y+2x+30=180$

$5x+y=228$ $2x+y=150 \rightarrow 52+y=150$

$\boxed{y=98°}$

$\begin{cases} 5x+y=228 \\ (2x+y=150)-1 \end{cases} \Rightarrow$

$5x+y=228$
$-2x-y=-150$
_____
$3x=78$

$x=26$

✳✳✳ 20. If $m\angle FCB = (18x+6)°$ and $m\angle GCB = (13x-9)°$, find $m\angle GCF$.

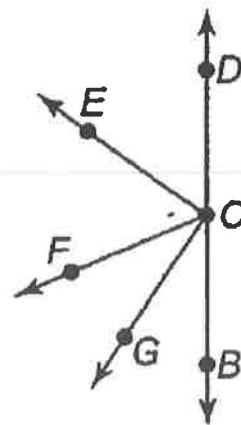$\overrightarrow{CG}$ bisects $\angle FCB$

$13x-9+13x-9=18x+6$

$26x-18=18x+6$

$8x=24$

$\boxed{x=3}$

$m\angle GCF = 13(3)-9$

$\boxed{m\angle GCF = 30°}$

21. If m∠K and m∠J are supplementary, and m∠K is 5 more than 6 times the m∠J, then m∠K = __155°__.
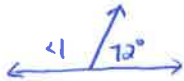
$$x + y = 180$$

$$x = 5 + 6y$$

$$5 + 6y + y = 180$$

$$x = 5 + 6(25)$$

$$7y = 175 \Rightarrow y = 25$$

$$x = 155$$

22. ∠1 and ∠2 are supplementary angles. ∠1 and ∠3 are vertical angles. If m∠2 = 72°, what is m∠3?

∠1 ⟋ 72°

$$\boxed{m\angle 3 = 108°}$$

m∠1 = 108°

23. ∠A and ∠B are complementary angles. ∠C and ∠D are supplementary angles. Find the measures of the four angles, if $m\angle A = 2x°$, $m\angle B = 6y°$, $m\angle C = (6x+y)°$, and $m\angle D = (4x+2y)°$.

$$2x + 6y = 90$$

$$6x + y + 4x + 2y = 180$$

$$\Rightarrow \begin{array}{c} 2x + 6y = 90 \\ -2(10x + 3y = 180) \end{array}$$

$$\Rightarrow \begin{array}{c} 2x + 6y = 90 \\ -20x - 6y = -360 \end{array}$$

$$-18x = -270$$

$$\boxed{x = 15}$$

$$30 + 6y = 90$$

$$6y = 60$$

$$\boxed{y = 10}$$

m∠A = 30°   m∠C = 100°

m∠B = 60°   m∠D = 80°

24. Find the values of x, y, and z, and then find the measure of each angle in the diagram below.

142
(16x + 30)°
38 (5x + 3)°   (3y + 2)° 38
4z°
142

$$21x + 33 = 180$$
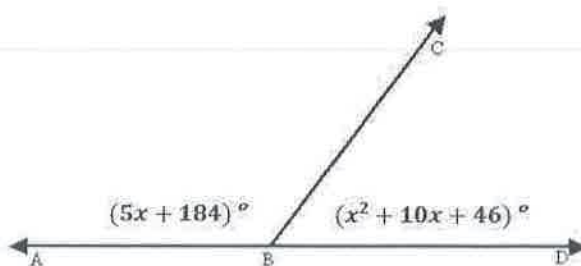
$$21x = 147$$

$$\boxed{x = 7}$$

$$3y + 2 = 38$$
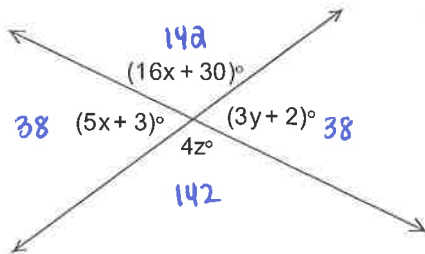
$$3y = 36$$

$$\boxed{y = 12}$$

$$4z = 142$$

$$\boxed{z = 35.5}$$

25. Given the diagram to the right, what are the possible measures of both angles?

$(5x + 184)°$ $(x^2 + 10x + 46)°$

A   B   D

C

$$x^2 + 15x + 230 = 180$$

$$x^2 + 15x + 50 = 0$$

$$(x + 10)(x + 5) = 0$$

$$x = -10, \quad x = -5$$

m∠ABC = 5(-10) + 184

= -50 + 184

= $\boxed{+134°}$

m∠CBD = $(-10)^2 + 10(-10) + 46$

$\boxed{= 46°}$

m∠ABC = 5(-5) + 184 = -25 + 184 = $\boxed{159°}$

m∠CBD = $(-5)^2 + 10(-5) + 46$

$\boxed{= 21°}$