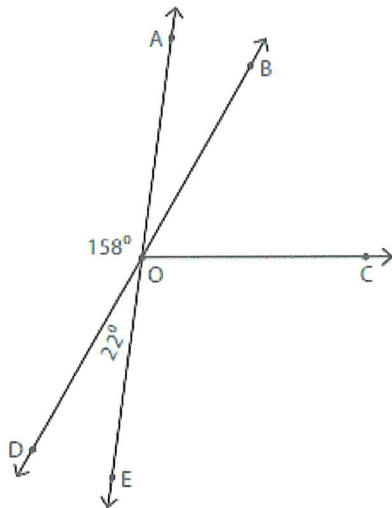


1.



a) $\angle AOB$ and $\angle AOD$ are linear. Find $\angle AOB$.

$$\underline{180 - 158 = 22^\circ}$$

b) Name the adjacent angles with side OB.

$$\underline{\angle AOB \text{ and } \angle BOC}$$

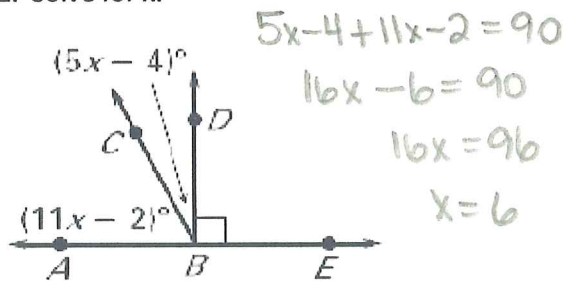
c) Name the angle vertical to 158° .

$$\underline{\angle EOD}$$

d) Name the angles adjacent to $\angle DOA$.

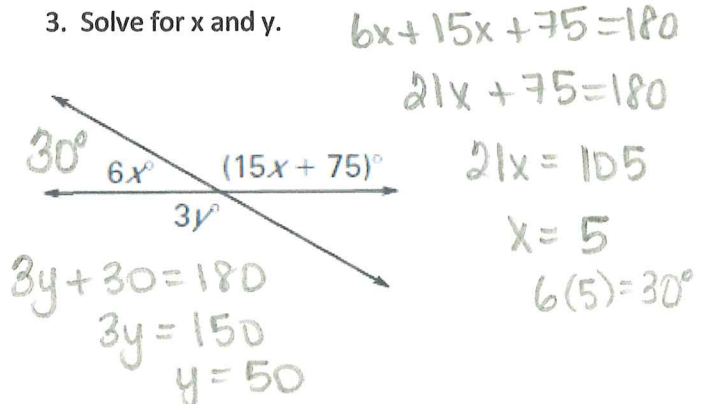
$$\underline{\angle EOD, \angle AOB}$$

2. Solve for x.



$$\begin{aligned} 5x - 4 + 11x - 2 &= 90 \\ 16x - 6 &= 90 \\ 16x &= 96 \\ x &= 6 \end{aligned}$$

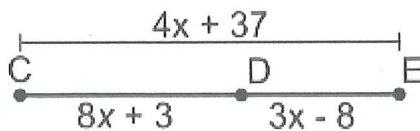
3. Solve for x and y.



$$\begin{aligned} 6x + 15x + 75 &= 180 \\ 21x + 75 &= 180 \\ 21x &= 105 \\ x &= 5 \\ 6(5) &= 30^\circ \end{aligned}$$

$$\begin{aligned} 3y + 30 &= 180 \\ 3y &= 150 \\ y &= 50 \end{aligned}$$

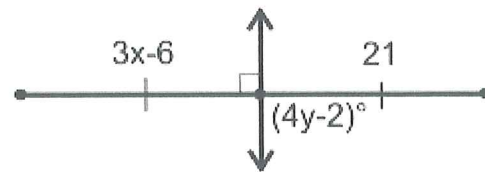
4. Find x, CD, and DE



$$\begin{aligned} 8x + 3 + 3x - 8 &= 4x + 37 \\ 11x - 5 &= 4x + 37 \\ 7x - 5 &= 37 \\ 7x &= 42 \\ x &= 6 \end{aligned}$$

$$\begin{aligned} CD &= 51 \\ 8(6) + 3 \\ DE &= 10 \\ 3(6) - 8 \end{aligned}$$

5. Find x and y



$$\begin{aligned} 3x - 6 &= 21 \\ 3x &= 27 \\ x &= 9 \end{aligned}$$

$$\begin{aligned} 4y - 2 &= 90 \\ 4y &= 92 \\ y &= 23 \end{aligned}$$

6. For each of the following. Solve for x.

a) $\angle A$ and $\angle B$ form a linear pair. If $m\angle A = (2x)^\circ$ and $m\angle B = (x-15)^\circ$ $2x + x - 15 = 180$

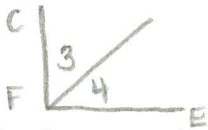


$$3x - 15 = 180$$

$$3x = 195$$

$$x = 65$$

b) $\angle CFE$ is a right angle. $m\angle 3 = (3x+5)^\circ$, $m\angle 4 = (2x)^\circ$



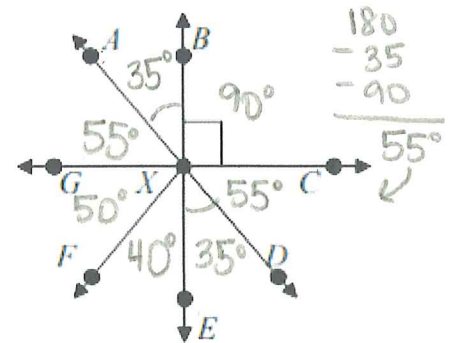
$$3x + 5 + 2x = 90$$

$$5x + 5 = 90 \quad x = 17$$

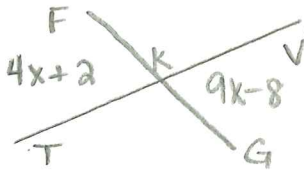
$$5x = 85$$

7. Use the diagram to determine the angle sizes if $m\angle FXE = 40^\circ$ and $m\angle EXD = 35^\circ$.

- a. $m\angle GXE = 90^\circ$ b. $m\angle CXD = 55^\circ$ c. $m\angle FXG = 50^\circ$
 d. $m\angle GXA = 55^\circ$ e. $m\angle AXB = 35^\circ$ f. $m\angle AXC = 125^\circ$
 g. $m\angle AXF = 105^\circ$ h. $m\angle CXF = 130^\circ$ i. $m\angle FXD = 75^\circ$



8. Lines \overline{TV} and \overline{FG} intersect at point K. $\angle TKF = 4x + 2$ and $\angle VKG = 9x - 8$. Find the measure of both angles.



$$4x + 2 = 9x - 8$$

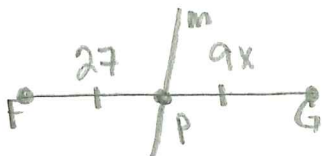
$$-5x + 2 = -8$$

$$-5x = -10$$

$$x = 2 \quad \angle TKF = 4(2) + 2 = 10$$

$$\angle VKG = 9(2) - 8 = 10$$

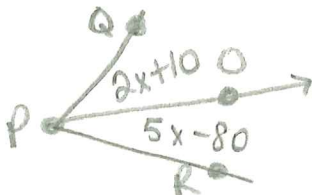
9. Line m is a bisector of \overline{FG} . The two lines intersect at point P. $\overline{FP} = 27$ and $\overline{PG} = 9x$. Find the value of x.



$$9x = 27$$

$$x = 3$$

10. \overline{PO} bisects $\angle QPR$. If $\angle QPO = 2x + 10$ and $\angle OPR = 5x - 80$, find $m\angle QPR$.



$$2x + 10 = 5x - 80$$

$$-3x + 10 = -80$$

$$-3x = -90 \quad x = 30$$

$$\angle QPO = 2(30) + 10 = 70$$

$$\angle OPR = 5(30) - 80 = 70$$

$$\angle QPR = 140$$

11. Consider circle T with two endpoints of its diameter at $(-4,1)$ and $(3,12)$. How long is the diameter of T? What is the radius of T? Where is the center point T?



$$d = \sqrt{(-4-3)^2 + (1-12)^2}$$

$$= \sqrt{49 + 121} = 13.0$$

diameter

$$13/2 = 6.5 \text{ radius}$$

Center

$$\left(\frac{-4+3}{2}, \frac{1+12}{2} \right)$$

$$\left(-\frac{1}{2}, \frac{13}{2} \right)$$

12. The coordinates of quadrilateral $ABCD$ are $A(-6, -2)$, $B(-2, 5)$, $C(7, 5)$, and $D(3, -2)$.

Use the grid provided to answer the following questions.

$A(-6, -2)$ $C(7, 5)$

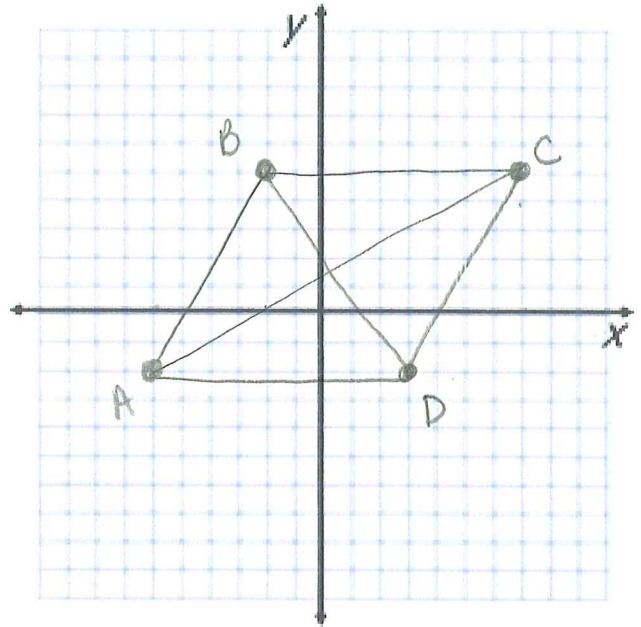
(a) What is the length of the diagonal AC ?

$$d = \sqrt{(-6-7)^2 + (-2-5)^2} = \sqrt{169 + 49} = \boxed{14.8}$$

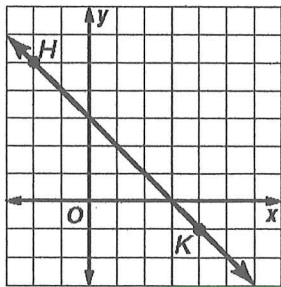
(b) At what point do the diagonals bisect each other?

midpoint $A(-6, -2)$ $C(7, 5)$

$$\left(\frac{-6+7}{2}, \frac{-2+5}{2}\right) = \left(\frac{1}{2}, \frac{3}{2}\right)$$



13. What is the midpoint and distance of segment HK shown in the graph?



$H(-2, 5)$ $K(4, -1)$

midpoint

$$\left(\frac{-2+4}{2}, \frac{5+(-1)}{2}\right)$$

$$\left(\frac{2}{2}, \frac{4}{2}\right) = \boxed{(1, 2)}$$

Dist.

$$\sqrt{(-2-4)^2 + (5-(-1))^2}$$

$$\sqrt{36 + 36}$$

$$\boxed{8.5}$$

14. K is the midpoint of \overline{PQ} , P has coordinates $(-9, -4)$, and K has coordinates $(-1, 6)$. What are the coordinates of Q ?

A $(-5, 1)$

B $(5, 10)$

C $(-11, 8)$

D $(7, 16)$

$$\begin{array}{ccccccc} -9 & +8 & -1 & +8 & 7 & & (7, 16) \\ \bullet & & \bullet & & \bullet & & \\ P & & K & & Q & & \end{array}$$

$$\begin{array}{ccccccc} -4 & +10 & 6 & +10 & 16 & & \\ & & & & & & \end{array}$$

$$2(-1) - (-9) = -2 + 9 = 7$$

$$2(6) - (-4) = 12 + 4 = 16$$

15. $\overline{JM} \perp \overline{CS}$ and point S lies on \overline{JM} . What is the measure of $\angle CSM$?



$$90^\circ = m\angle CSM$$