

Write a short description of the following terms.

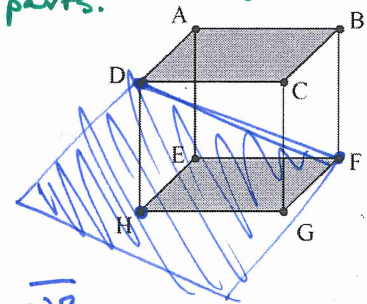
- Point: a 0-dimensional object describing location
- Line: a 1-dimensional object extending infinitely in opposite directions.
- Plane: an infinitely thin surface

Write the definitions for each of the following terms as biconditional statements. *iff = if and only if*

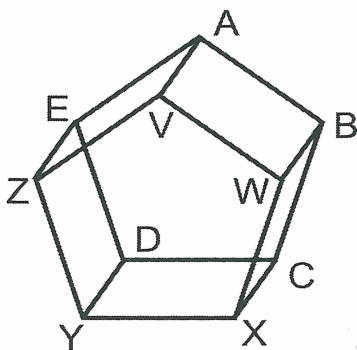
- Segment: A figure is a segment iff it is a collection of two endpoints and all the points in between.
- Ray: A figure is a ray iff it consists of one endpoint and all the points that lie on one side of that endpoint.
- Circle: A figure is a circle iff it is a collection of all the points equidistant from a center point.
- Angle: A figure is an angle iff it is formed by two rays w/ a common vertex.
- Parallel Lines: Lines are parallel lines iff they are coplanar and don't intersect.
- Perpendicular Lines: Lines are perpendicular iff they intersect to form a right angle.
- Skew Lines: Two figures are skew lines iff they are noncoplanar lines that never intersect.
- Perpendicular Bisector: Two objects are perpendicular iff they form a right angle
- Angle Bisector: A line, segment, or ray is a perpendicular bisector iff it intersects a segment at a right angle and divides that segment into two \cong parts.

Use the figure at the right to name the intersections of the following figures. \cong parts.

- Planes EFG and DAE. \overleftrightarrow{EH} or \overleftrightarrow{HE}
- Line \overleftrightarrow{DC} and Line \overleftrightarrow{BC} . point C
- Shade the plane that contains the points D, H, and F.



Use the figure below for problems 16-19.



- Name a segment that is skew to segment \overline{XY} . \overline{WB}
- Name a segment that is parallel to segment \overline{ZY} . \overline{ED}
- Name a plane that is parallel to ZYX. plane ABC
- Name a Line that is parallel to plane EAB. \overleftrightarrow{XY}

Complete each of the following. Read the directions carefully.

20. a) Write the converse of the conditional: If a person is elected president of the US then they won the presidential election.
If a person won the presidential election, then they are elected president of the US.
 b) Determine the truth-value of the converse. If false, give a counter example. If true, write the statement as a biconditional.

A person is elected as president iff they win the presidential election.

21. a) Write the converse of the conditional: If it is a tulip, then it is a flower.

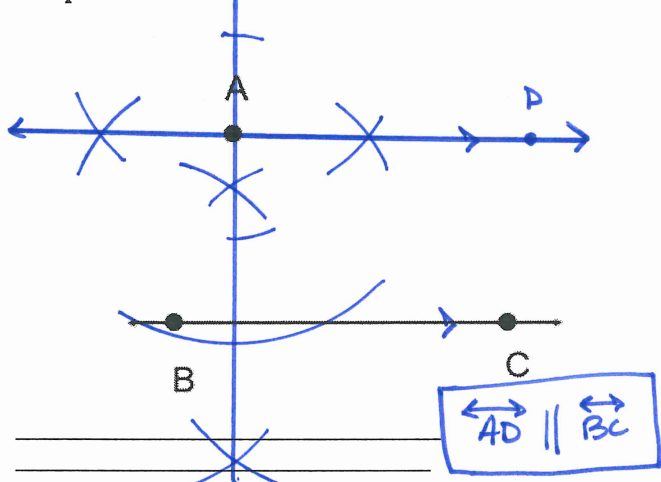
If it is a flower, then it is a tulip.

- b) Determine the truth-value of the converse. If false, give a counter example. If true, write the statement as a biconditional.

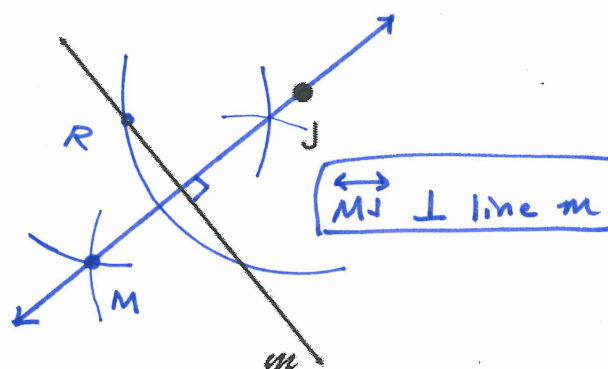
False, the flower could be a sunflower.

Use a compass and a straightedge to complete each of the following constructions.

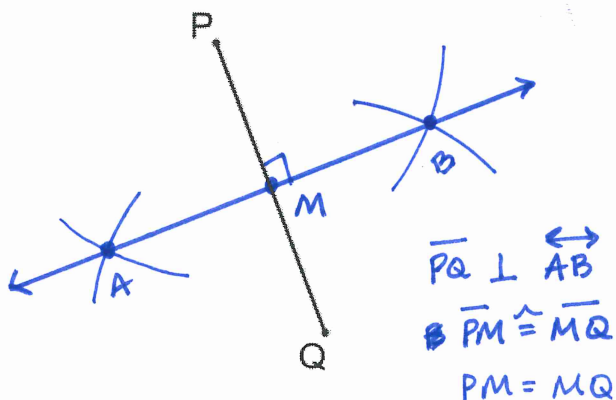
22. Construct a line parallel to the given line through the given point. Write an accurate statement and include parallel line indicators.



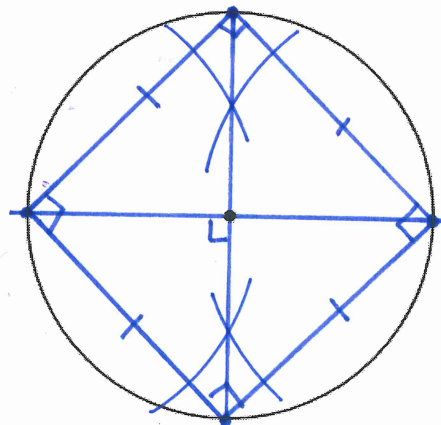
23. Construct a line perpendicular to the given line through the given point not on the line. Write an accurate statement and include the perpendicular line indicator.



24. Construct the perpendicular bisector of the given segment. Write an accurate statement that describes the construction and include all necessary indicators.



25. Construct a square inscribed in the given circle. Mark all congruent segments and right angles.



Find the value of x and the length of the segment

26. $\overline{QS} = 71$



$$3x+11 + 7x-10 = 71$$

$$10x + 1 = 71$$

$$10x = 70 \quad x = 7$$

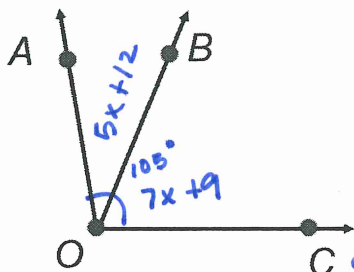
$$\overline{QR} = 3(7) + 11 = 32$$

$$\overline{RS} = 7(7) - 10 = 39$$

$x = 7$ $\overline{QR} = 32$ $\overline{QS} = 71$

Find the value of x and the measure of each angle.

28. $m\angle AOB = 5x + 12$, $m\angle BOC = 7x + 9$, and $m\angle AOC = 105^\circ$



$$5x + 12 + 7x + 9 = 105$$

$$12x + 19 = 105$$

$$12x = 86$$

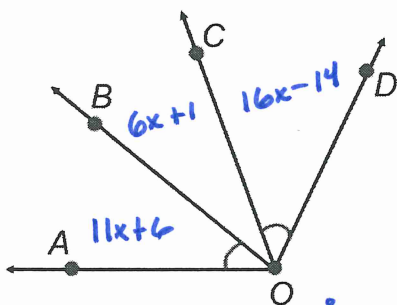
$$x = 7.1\bar{6}$$

$$m\angle AOB = 5\left(\frac{43}{6}\right) + 12 = 47.8$$

$$m\angle BOC = 7\left(\frac{43}{6}\right) + 9 = 59.1\bar{6}$$

$x = 7.1\bar{6}$, $m\angle AOB = 47.8$, $m\angle BOC = 59.1\bar{6}$

29. $m\angle AOB = 11x + 6$, $m\angle BOC = 6x + 1$, $m\angle COD = 16x - 14$



$$m\angle AOB \cong m\angle COD \rightarrow 11x + 6 = 16x - 14$$

$$-11x + 14 = -11x + 14$$

$$20 = 5x$$

$$x = 4$$

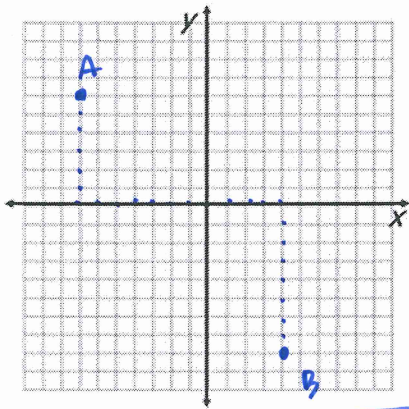
$$m\angle AOB = 11(4) + 6 = 50$$

$$m\angle BOC = 6(4) + 1 = 25^\circ$$

$x = 4$, $m\angle AOB = 50^\circ$, $m\angle BOC = 25^\circ$, $m\angle COD = 50^\circ$

Use the distance formula and the midpoint formula to complete problems 30-32 and the section formula to complete #33.

30. The distance between A (-7, 6) and B (4, -8).

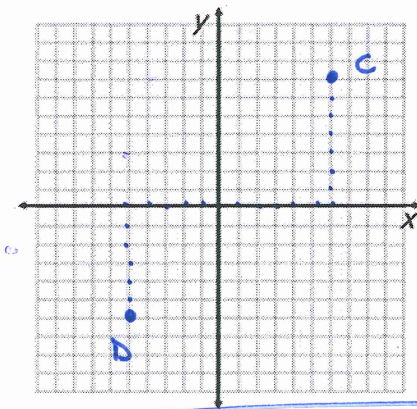


$$AB = \sqrt{(-7-4)^2 + (6-(-8))^2}$$

$$AB = \sqrt{121 + 196}$$

$$AB = \sqrt{317} \approx 17.8$$

31. The distance between C (6, 7) and D (-5, -6).



$$CD = \sqrt{(6-(-5))^2 + (7-(-6))^2}$$

$$CD = \sqrt{121 + 169}$$

$$CD = \sqrt{290} \approx 17.02$$

27.



$$3x+6 = 6x-12$$

$$-3x+12 = -3x+12$$

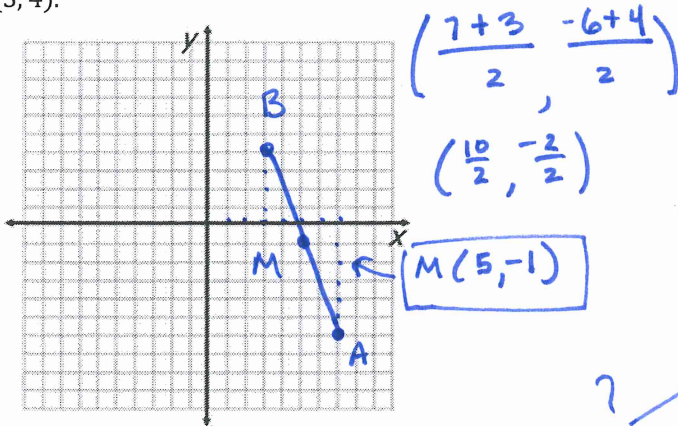
$$\frac{18}{3} = \frac{3x}{3}$$

$$x = 6$$

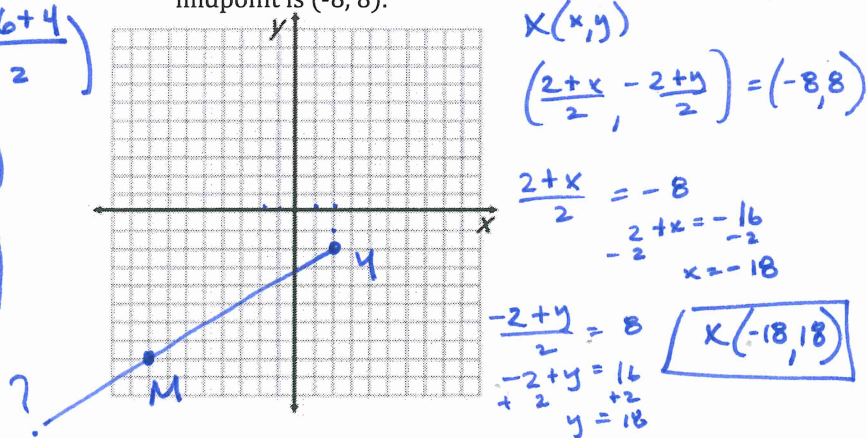
$$3(6)+6 + 6(6)-12 = 48$$

$x = 6$ $\overline{TV} = 48$

32. The midpoint of the segment AB, where A (7, -6) and B (3, 4).

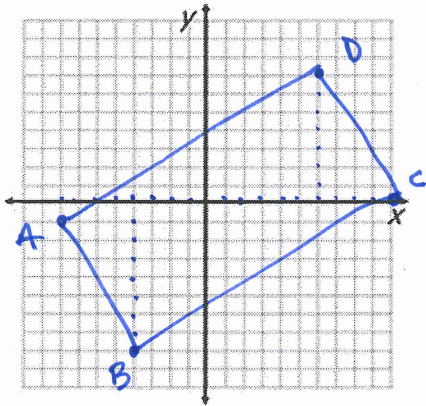


33. Find the endpoint X for \overline{XY} where Y (2, -2) and the midpoint is (-8, 8).



Use the distance formula to calculate the perimeter and area of the following figures in the coordinate plane. Plot the given points and sketch the figure.

34. A (-8, -1), B (-4, -8), C (10, 0), D (6, 7)



$$AB = \sqrt{(-8-(-4))^2 + (-1-(-8))^2}$$

$$AB = \sqrt{16 + 49}$$

$$AB = \sqrt{65}$$

$$CD = \sqrt{(10-6)^2 + (0-7)^2}$$

$$CD = \sqrt{16 + 49}$$

$$CD = \sqrt{65}$$

$$AD = \sqrt{(-8-6)^2 + (-1-7)^2}$$

$$AD = \sqrt{196 + 64}$$

$$AD = \sqrt{260}$$

$$BC = \sqrt{(-4-10)^2 + (-8-0)^2}$$

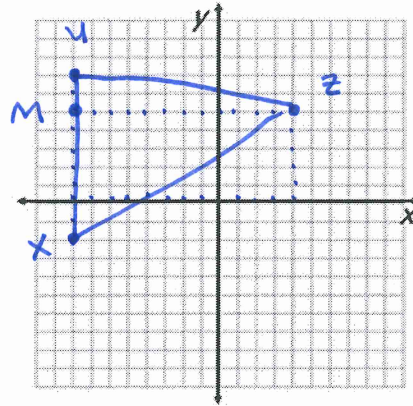
$$BC = \sqrt{164 + 64}$$

$$BC = \sqrt{260}$$

$$\text{Perimeter} = 2\sqrt{65} + 2\sqrt{260} = 32.24 \text{ units}$$

$$\text{Area} = \sqrt{65} \cdot \sqrt{260} = 130 \text{ units}^2$$

35. X (-8, -2), Y (-8, 7), and Z (4, 5)



$$XY = 9 \text{ units}$$

$$YZ = \sqrt{(-8-4)^2 + (7-5)^2}$$

$$YZ = \sqrt{144 + 4} = \sqrt{148}$$

$$XZ = \sqrt{(-8-4)^2 + (-2-5)^2}$$

$$XZ = \sqrt{144 + 49} = \sqrt{193}$$

$$\text{Perimeter} = 9 + \sqrt{148} + \sqrt{193} = 35.05 \text{ units}$$

$$\text{Area} = \frac{1}{2} (XY) (MZ)$$

$$\frac{1}{2} (9) (12) = 54 \text{ units}^2$$