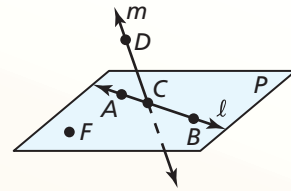


1.1 Points, Lines, and Planes (pp. 3–10)

Use the diagram at the right. Give another name for plane P . Then name a line in the plane, a ray, a line intersecting the plane, and three collinear points.

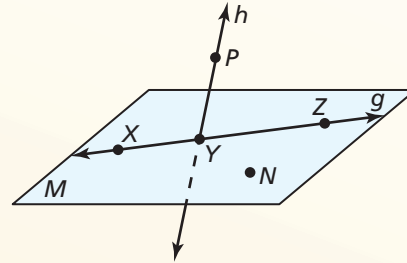
You can find another name for plane P by using any three points in the plane that are not on the same line. So, another name for plane P is plane FAB .

A line in the plane is \overleftrightarrow{AB} , a ray is \overrightarrow{CB} , a line intersecting the plane is \overleftrightarrow{CD} , and three collinear points are A , C , and B .



Use the diagram.

1. Give another name for plane M .
2. Name a line in the plane.
3. Name a line intersecting the plane.
4. Name two rays.
5. Name a pair of opposite rays.
6. Name a point not in plane M .



1.2 Measuring and Constructing Segments (pp. 11–18)

a. Find AC .



$$\begin{aligned} AC &= AB + BC \\ &= 12 + 25 \\ &= 37 \end{aligned}$$

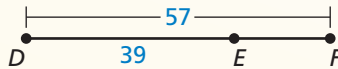
Segment Addition Postulate (Postulate 1.2)

Substitute 12 for AB and 25 for BC .

Add.

▶ So, $AC = 37$.

b. Find EF .



$$\begin{aligned} DF &= DE + EF \\ 57 &= 39 + EF \\ 18 &= EF \end{aligned}$$

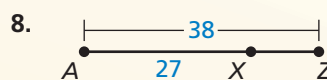
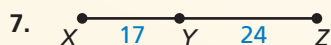
Segment Addition Postulate (Postulate 1.2)

Substitute 57 for DF and 39 for DE .

Subtract 39 from each side.

▶ So, $EF = 18$.

Find XZ .



9. Plot $A(8, -4)$, $B(3, -4)$, $C(7, 1)$, and $D(7, -3)$ in a coordinate plane. Then determine whether \overline{AB} and \overline{CD} are congruent.

1.3 Using Midpoint and Distance Formulas (pp. 19–26)

The endpoints of \overline{AB} are $A(6, -1)$ and $B(3, 5)$. Find the coordinates of the midpoint M . Then find the distance between points A and B .

Use the Midpoint Formula.

$$M\left(\frac{6+3}{2}, \frac{-1+5}{2}\right) = M\left(\frac{9}{2}, 2\right)$$

Use the Distance Formula.

$$\begin{aligned} AB &= \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2} \\ &= \sqrt{(3 - 6)^2 + [5 - (-1)]^2} \\ &= \sqrt{(-3)^2 + 6^2} \\ &= \sqrt{9 + 36} \\ &= \sqrt{45} \\ &\approx 6.7 \text{ units} \end{aligned}$$

Distance Formula

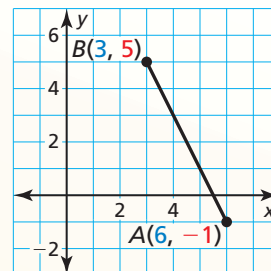
Substitute.

Subtract.

Evaluate powers.

Add.

Use a calculator.



► So, the midpoint is $M\left(\frac{9}{2}, 2\right)$, and the distance is about 6.7 units.

Find the coordinates of the midpoint M . Then find the distance between points S and T .

10. $S(-2, 4)$ and $T(3, 9)$

11. $S(6, -3)$ and $T(7, -2)$

12. The midpoint of \overline{JK} is $M(6, 3)$. One endpoint is $J(14, 9)$. Find the coordinates of endpoint K .

13. Point M is the midpoint of \overline{AB} where $AM = 3x + 8$ and $MB = 6x - 4$. Find AB .

1.4 Perimeter and Area in the Coordinate Plane (pp. 29–36)

Find the perimeter and area of rectangle $ABCD$ with vertices $A(-3, 4)$, $B(6, 4)$, $C(6, -1)$, and $D(-3, -1)$.

Draw the rectangle in a coordinate plane. Then find the length and width using the Ruler Postulate (Postulate 1.1).

Length $AB = |-3 - 6| = 9$

Width $BC = |4 - (-1)| = 5$

Substitute the values for the length and width into the formulas for the perimeter and area of a rectangle.

$$P = 2\ell + 2w$$

$$= 2(9) + 2(5)$$

$$= 18 + 10$$

$$= 28$$

$$A = \ell w$$

$$= (9)(5)$$

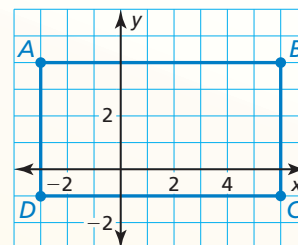
$$= 45$$

► So, the perimeter is 28 units, and the area is 45 square units.

Find the perimeter and area of the polygon with the given vertices.

14. $W(5, -1)$, $X(5, 6)$, $Y(2, -1)$, $Z(2, 6)$

15. $E(6, -2)$, $F(6, 5)$, $G(-1, 5)$



1.5 Measuring and Constructing Angles (pp. 37–46)

Given that $m\angle DEF = 87^\circ$, find $m\angle DEG$ and $m\angle GEF$.

Step 1 Write and solve an equation to find the value of x .

$$m\angle DEF = m\angle DEG + m\angle GEF$$

$$87^\circ = (6x + 13)^\circ + (2x + 10)^\circ$$

$$87 = 8x + 23$$

$$64 = 8x$$

$$8 = x$$

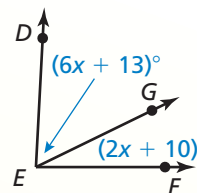
Angle Addition Postulate (Post. 1.4)

Substitute angle measures.

Combine like terms.

Subtract 23 from each side.

Divide each side by 8.



Step 2 Evaluate the given expressions when $x = 8$.

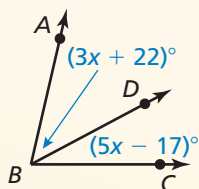
$$m\angle DEG = (6x + 13)^\circ = (6 \cdot 8 + 13)^\circ = 61^\circ$$

$$m\angle GEF = (2x + 10)^\circ = (2 \cdot 8 + 10)^\circ = 26^\circ$$

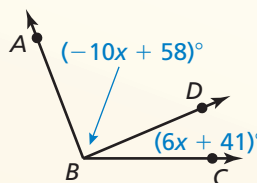
► So, $m\angle DEG = 61^\circ$, and $m\angle GEF = 26^\circ$.

Find $m\angle ABD$ and $m\angle CBD$.

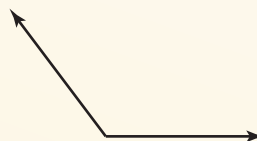
16. $m\angle ABC = 77^\circ$



17. $m\angle ABC = 111^\circ$



18. Find the measure of the angle using a protractor.



1.6 Describing Pairs of Angles (pp. 47–54)

a. $\angle 1$ is a complement of $\angle 2$, and $m\angle 1 = 54^\circ$. Find $m\angle 2$.

Draw a diagram with complementary adjacent angles to illustrate the relationship.

$$m\angle 2 = 90^\circ - m\angle 1 = 90^\circ - 54^\circ = 36^\circ$$

b. $\angle 3$ is a supplement of $\angle 4$, and $m\angle 4 = 68^\circ$. Find $m\angle 3$.

Draw a diagram with supplementary adjacent angles to illustrate the relationship.

$$m\angle 3 = 180^\circ - m\angle 4 = 180^\circ - 68^\circ = 112^\circ$$

$\angle 1$ and $\angle 2$ are complementary angles. Given $m\angle 1$, find $m\angle 2$.

19. $m\angle 1 = 12^\circ$

20. $m\angle 1 = 83^\circ$

$\angle 3$ and $\angle 4$ are supplementary angles. Given $m\angle 3$, find $m\angle 4$.

21. $m\angle 3 = 116^\circ$

22. $m\angle 3 = 56^\circ$

