

Informal Geometry and Measurement

Undefined Terms (set, point, line, plane)

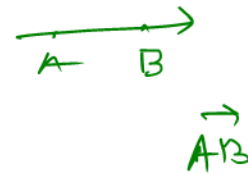
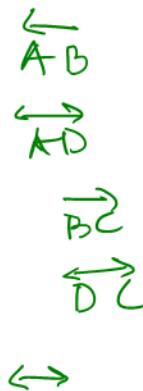
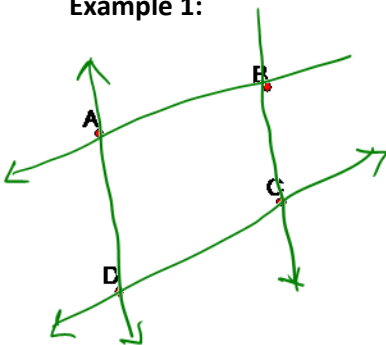
- A point, which is represented as a dot, has location but not size.
- A line is an infinite set of points. Given any 3 distinct points on the same line, they are said to be **collinear**.
- A line segment is part of a line. It consists of two distinct points and all points between them.

Notation: $\angle ABC$ (angle ABC), ΔABC (triangle ABC) and $\square ABCD$ (rectangle ABCD).

Rays are named: $\overset{A}{\underset{\vec{AB}}{\longrightarrow}} B$ or $\overset{B}{\underset{\vec{BA}}{\longleftarrow}} A$

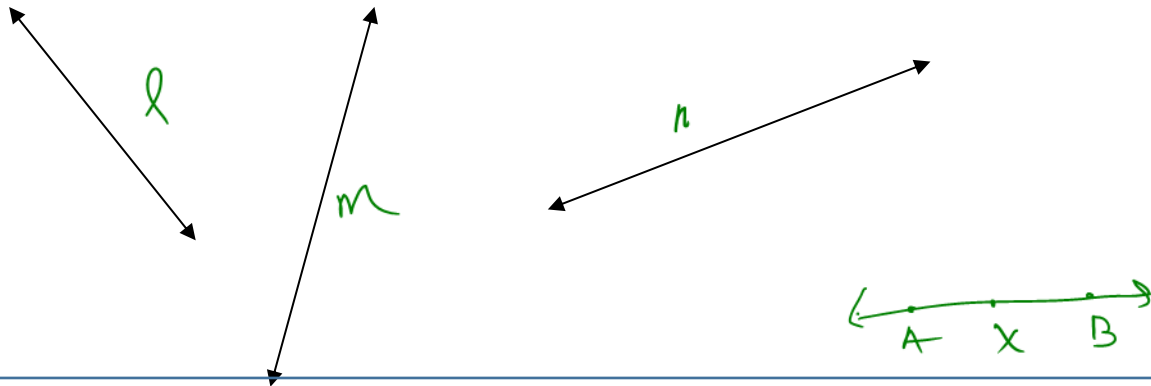
A **point** is represented by a dot and has a unique location. We use upper case letters to name points.

Example 1:



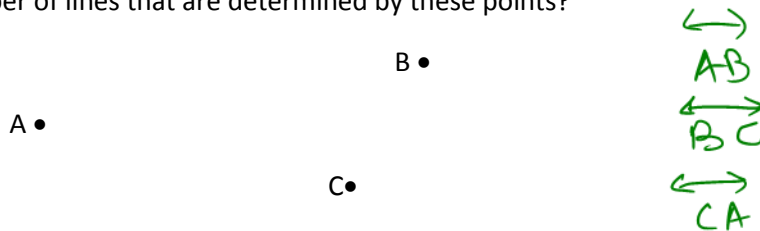
A **line** is an infinite set of points. (Symbol: \longleftrightarrow)

Example 2:



Points that lie on the same line are called collinear (Symbol: $A - X - B$) Points that do not lie on the same line are called non-collinear.

Example 3: Consider noncollinear points A, B, and C. If each line must contain both points, what is the total number of lines that are determined by these points?



A **line segment** is part of a line. (Symbol, \overline{AB} where A and B are the end point)

Example 4: Given the following line segments: $\overline{A} \quad \overline{B} \quad \overline{C}$

If $AC = 22$ and $BC = 14$ what does $AB = ?$

$$\begin{aligned}
 AB + BC &= AC \\
 AB + 14 &= 22 \\
 AB &= 22 - 14 = 8
 \end{aligned}$$

Example 5:

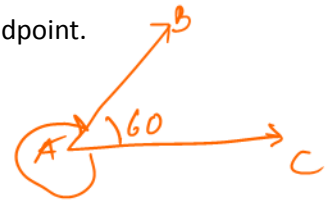
How many lines can be drawn through

1. point A ? infinite
2. both points A and B ? 1
3. all points A , and B , and C ? 3
4. Where do \overleftrightarrow{AB} and \overleftrightarrow{AC} intersect? A

Definition: An angle is union of two rays that share a common endpoint.

FACTS:

- The measure of an angle is a unique positive number.
- An angle whose measures less than 90° is an acute angle.
- An angle whose measures exactly 90° is a right angle.
- An angle whose measures exactly 180° is a straight angle.
- If an angle measures between 90° and 180° it is an obtuse angle.
- A reflex angle is one whose measure is between 180° and 360° .



Definition: (in your words define each)

(1) Perpendicular lines

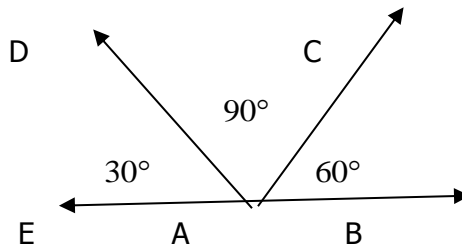
Lines which intersect at 90°

(2) Parallel lines

Lines which never meet together

or lines which have the same slope

Example 6: Use the following figure to answer each question.



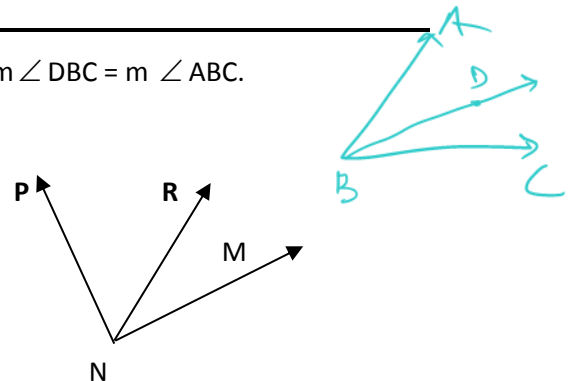
Find the following:

- a. Straight angle $\angle EAB$
- b. Right angle $\angle DAC$
- c. Acute angle $\angle CAB$ & $\angle DAE$
- d. Obtuse angle $\angle EAC$ & $\angle DAB$

If a point D lies in the interior of the angle ABC, then $m\angle ABD + m\angle DBC = m\angle ABC$.

Example 7: Given:

$$m\angle PNM = m\angle PNR + m\angle RNM$$



- a. If $m\angle MNP = 76^\circ$ and $m\angle MNR = 47^\circ$ find $m\angle PNR$.

$$m\angle PNR + 47 = 76$$

$$m\angle PNR = 76 - 47 = 29^\circ$$

- b. If $m\angle MNP = 76^\circ$ and \overline{NR} bisects $\angle MNP$, find $m\angle PNR$.

$$m\angle PNR = m\angle RNM$$

$$m\angle PNR + m\angle PNR = m\angle PNM$$

$$2\angle PNR = 76$$

$$\angle PNR = \frac{76}{2} = 38^\circ$$

- c. Find x , if $m\angle PNR = 2x + 9$ and $m\angle RNM = 3x - 2$ and $m\angle PNM = 67^\circ$.

$$2x + 9 + 3x - 2 = 67$$

$$5x + 7 = 67$$

$$5x = 60$$

$$x = \frac{60}{5} = 12$$

Definition: Congruent angles (\cong , \sphericalangle s) are two angles with the same measure.

Definition: The bisector of an angle is the ray that separates the given angle into two congruent angles.

Definition: Two angles are Complementary angles if the sum of their measures is 90° . Each angle in the pair is known as the **complement** of the other angle.

Definition: Two angles are Supplementary angles if the sum of their measures is 180° . Each angle in the pair is known as the **supplement** of the other angle.

Example 8: If the measure $m\angle A = (2x)^\circ$, and the $m\angle B = (x - 6)^\circ$, and $m\angle A$ and $m\angle B$ are complementary, find x and the measure of each angle.

$$\begin{aligned} m\angle A + m\angle B &= 90 \\ 2x + x - 6 &= 90 \\ 3x &= 96 \\ x &= \frac{96}{3} = 32 \end{aligned}$$

$$\begin{aligned} m\angle A &= 2x \\ &= 2(32) \\ &= 64^\circ \\ m\angle B &= x - 6 \\ &= 32 - 6 \\ &= 26^\circ \end{aligned}$$

Example 9: If the measure $m\angle A = (2y - 9)^\circ$, and the $m\angle B = (7y)^\circ$, and $m\angle A$ and $m\angle B$ are supplementary, find x and the measure of each angle.

$$\begin{aligned} m\angle A + m\angle B &= 180 \\ 2y - 9 + 7y &= 180 \\ 9y - 9 &= 180 \\ 9y &= 189 \Rightarrow y = \frac{189}{9} = 21 \end{aligned}$$

$$\begin{aligned} m\angle A &= 2(21) - 9 \\ &= 42 - 9 \\ &= 33^\circ \\ m\angle B &= 7(21) \\ &= 147^\circ \end{aligned}$$

Now Try from your Textbook starting on page 17 #'s: 11, 12, 13, 14, 15, 32