



STARTING CONCEPTS IN GEOMETRY N-GEN MATH[®] 8



A good portion of 8th grade math is devoted to **geometry**. Geometry is the study of the math (or rules) that govern physical space, both two-dimensional and three dimensional. We will concentrate at the beginning on **two-dimensional** or **plane geometry** which occurs in a flat plane that extends forever. In this lesson we will concentrate on defining some basic concepts.

POINTS AND LINES

A **point** is a physical location in space that has no length, width, or depth. It has **zero dimensions** and is typically drawn as a very small circle and labeled with a **capital letter**.

A **line** is a set of **connected points** that **extends forever in two directions**. A line is typically named using two (or more) points on the line or by a lowercase letter.

Exercise #1: In the diagram below four points are plotted. Do the following using a **straightedge**.

- (a) Draw lines \overline{AB} and \overline{CD} .



- (b) When three points all lie on the same line, they are called **collinear**. Name three points that are collinear and three points that are not collinear in the diagram.



Three collinear points

Three non-collinear points



- (c) Why can't we find the length (or measure) of \overline{CD} ?

Sometimes we only want to use a **portion** of a line instead of the whole thing. This can take two different forms, **rays** and **segments**.

RAYS AND SEGMENTS

A **ray** is a portion of a line that has a starting point and then extends forever in one direction.

A **segment** is a portion of a line that has both a starting and ending point.



Exercise #2: Given the points shown, draw each ray that is specified.

(a) ray \overrightarrow{DC}

D •

(b) rays \overrightarrow{MN} and \overrightarrow{MP}

N •

C •

M •

P •

Exercise #3: In each of the three diagrams below, two identical points are shown. Draw each of the following using a straightedge.

(a) segment \overline{RS}

S •

(b) ray \overrightarrow{RS}

S •

(c) line \overleftrightarrow{RS}

S •

R •

R •

R •

It is often the case that we can name a **geometric object** using different names. It is important to be able to recognize when two things are the same.

Exercise #4: Points E, F, and G are collinear in the diagram below. For each problem state whether the two geometric objects named are the same or different.



(a) \overline{EF} and \overline{FG}

(b) \overline{EF} and \overline{EG}

(c) \overline{EG} and \overline{FE}

(d) \overline{GE} and \overline{FE}



Name: _____

Date: _____



STARTING CONCEPTS IN GEOMETRY
N-GEN MATH[®] 8 HOMEWORK

FLUENCY

1. On the diagram below, points A, B, C, and D are plotted.



(a) Draw lines \overline{AB} and \overline{CD} .

(b) Draw a point where the two lines **intersect** (cross) and label it E.

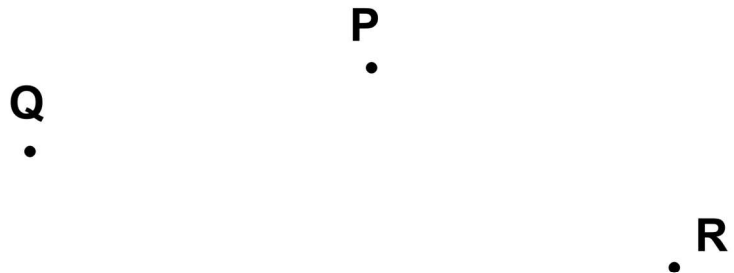
(c) You should now have five points shown in the diagram: A, B, C, D, and E. Give two sets of **three points** below that are **collinear**.

Set #1:

Set #2:

2. Given the three non-collinear points shown below, do the following:

(a) Draw rays \overrightarrow{PQ} and \overrightarrow{PR}

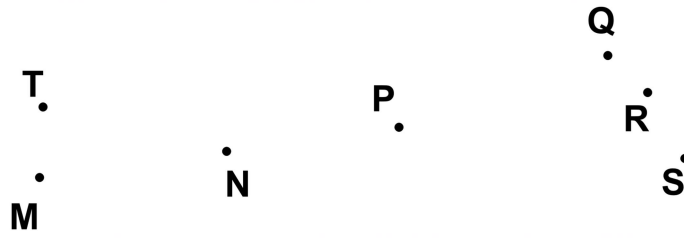


(b) Together the two rays that you drew can be considered a single **geometric object**. What do we call two rays joined at the same starting point?



3. Which of the following points below falls on ray \overrightarrow{NP} ? Draw a picture using a straightedge to justify your answer.

- (1) Q
- (2) R
- (3) S
- (4) T



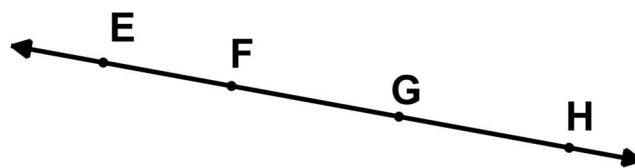
4. Which of the following would be another correct name of segment \overline{CD} shown below?

- (1) \overline{DC}
- (2) \overline{DE}
- (3) \overline{CD}
- (4) \overline{DC}



5. Points E, F, G, and H are collinear. Which of the following rays is the same geometric object as ray \overrightarrow{FH} ?

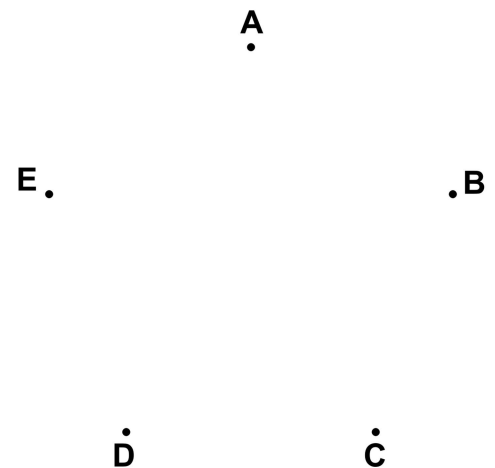
- (1) \overrightarrow{FE}
- (2) \overrightarrow{FG}
- (3) \overrightarrow{EH}
- (4) \overrightarrow{HF}



USING YOUR MATH

6. A company is designing a new logo using the five points shown in the diagram. Complete the logo by drawing the following five segments:

\overline{AC} , \overline{AD} , \overline{BC} , \overline{DE} , and \overline{BE}



REASONING

7. Which of the following could have its length measured: a line, a segment, or a ray? Explain.

