

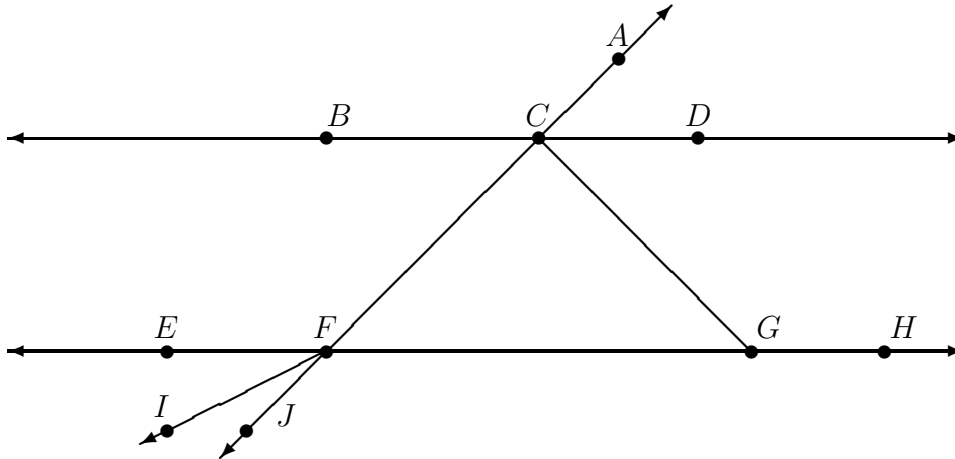
**All cell phones must be turned completely off.**

1. Complete each sentence with the term being defined; spell correctly.

- (a) An angle measuring more than  $180^\circ$  but less than  $360^\circ$  is called ...
- (b) Two or more lines in different planes that do not intersect are called ...
- (c) Three or more lines that intersect at exactly the same point are called ...
- (d) Points that lie in the same plane are called ...
- (e) A ray that divides an angle into two congruent halves is called ...
- (f) A polygon having twelve sides is called ...
- (g) A triangle having at least two congruent sides is called ...
- (h) A quadrilateral having exactly one pair of parallel sides (in the elementary school setting) is called ...

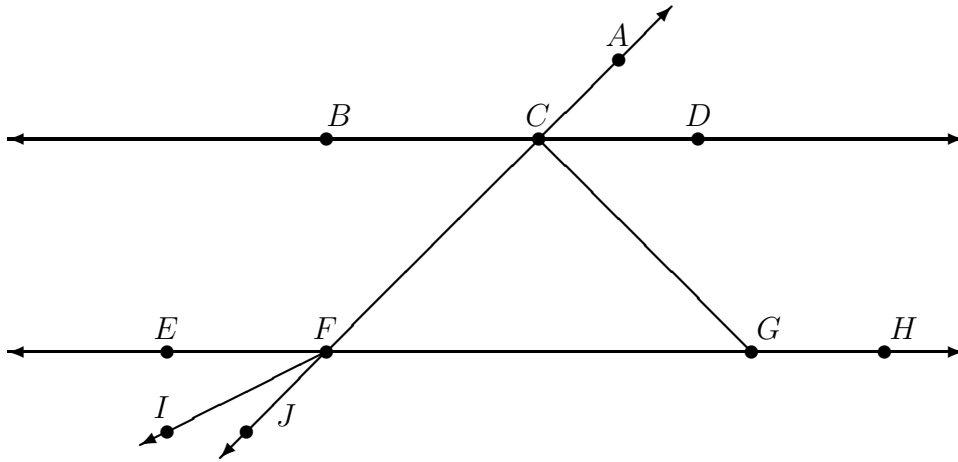
2. Tell how many diagonals a regular decagon has, thoroughly explaining how you know.

3. Referring to the diagram, use correct notation to name each object created below. (Additional copies of the diagram are available at my desk.)



- (a)  $\overrightarrow{CD} \cap \overrightarrow{DB}$
  - (b)  $\overrightarrow{CF} \cup \overrightarrow{JA}$
  - (c)  $\overline{EG} \cup \overrightarrow{FE}$
  - (d)  $\angle EFC \cap \angle DCF$
  - (e)  $\angle GFC \cap \angle JFG$
4. Referring again to the diagram, use correct notation to provide your own examples of the requested objects.
- (a) A transversal
  - (b) Four collinear points
  - (c) A pair of vertical angles having  $C$  as a vertex
  - (d) The sides of an acute angle having  $G$  as a vertex
  - (e) A pair of adjacent angles that are not a linear pair

5. Consider the diagram yet again, and suppose that  $\overleftrightarrow{BD} \parallel \overleftrightarrow{EH}$  while  $\overleftrightarrow{AJ} \perp \overleftrightarrow{CG}$ . If  $m(\angle IFJ) = 15^\circ$  and  $m(\angle ACD) = 40^\circ$ , find the measurements of the following angles, clearly explaining how you know in each case.



(a)  $m(\angle CGF)$

(b)  $m(\angle CGH)$

(c)  $m(\angle EFI)$

6. If  $A$  is in Quadrant II of the plane and  $B$  is in Quadrant III, where in the plane could the midpoint of  $\overline{AB}$  be? Show work or a supporting diagram, but you need not explain.

7. Draw *clear* examples of the following, if possible, thoroughly labelling or counting to emphasize the necessary features. If not possible, explain why not.

(a) A closed, non-simple curve

(b) A non-convex heptagon

(c) A kite that is not a rhombus

(d) A square that is not a rhombus

(e) A right obtuse triangle

(f) A quadrilateral that is equiangular but  
not equilateral

(g) Four lines that separate the plane  
into eight regions

(h) Four lines that separate the plane  
into six regions

8. (a) How large is each interior angle of a regular 45-gon? Either show clear computational work or else explain your reasoning verbally.
- (b) A convex  $n$ -gon has an interior angle total of  $12,780^\circ$ . How many sides does it have? Either show clear computational work or else explain your reasoning verbally.
9. Let  $G = (6, 1)$  and  $H = (3, -1)$ . Find a point  $I$  on  $\overleftrightarrow{GH}$  for which  $\overline{GI}$  is three times as long as  $\overline{IH}$ . Show clear work, but you need not explain.
10. Consider the points  $G = (6, 1)$ ,  $H = (3, -1)$ , and also  $P = (0, -4)$ . Find a fourth point  $Q$  for which  $G$ ,  $H$ ,  $P$ , and  $Q$  are the vertices of a parallelogram, briefly explaining your work.