med. = 82

Key $\frac{101}{100}$

Math 118 - Dr. Miller - Exam #2 - Spring 2006

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

Zeeshe

$\frac{21}{21}$

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

   (a) An angle measuring more than 180° but less than 360° is called ...

   a reflex angle.

   (b) Two or more lines in different planes that do not intersect are called ...

   skew lines.

   (c) Three or more lines that intersect at exactly the same point are called ...

   concurrent lines,

   (d) Points that lie in the same plane are called ...

   coplanar points.

   (e) A ray that divides an angle into two congruent halves is called ...

   the angle bisector.

   (f) A polygon having twelve sides is called ...

   a dodecagon.

   (g) A triangle having at least two congruent sides is called ...

   an isosceles triangle.

   (h) A quadrilateral having exactly one pair of parallel sides (in the elementary school setting) is called ...

   a trapezoid.

5

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

Each of the 10 vertices can be connected via a diagonal to 7 others (but not to itself or to the 2 vertices next to it, hence the 10 − 3).

That's 70 diagonals.

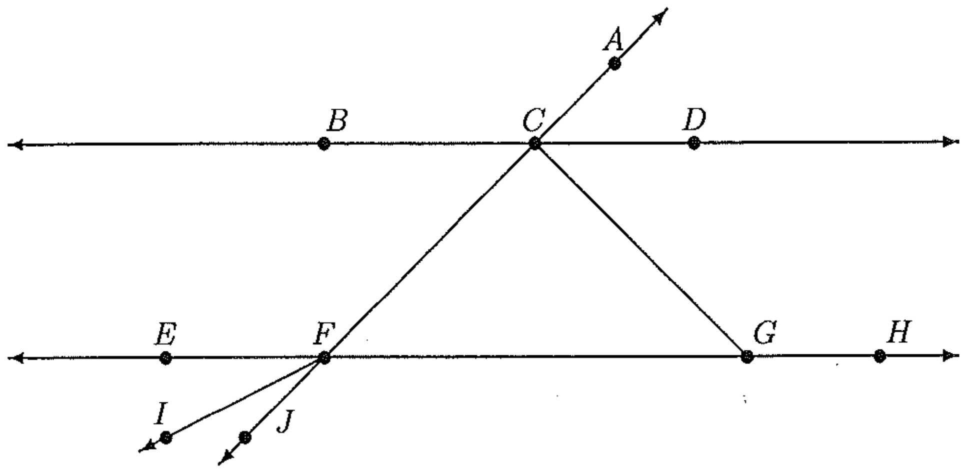
But now each one's been counted both from its beginning + from its ending vertex, so we have to divide by 2.

35 diagonals.

$\frac{20}{20}$

2 ea

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) $\overrightarrow{CD} \cap \overrightarrow{DB}$ $\overline{CD}$

(b) $\overrightarrow{CF} \cup \overrightarrow{JA}$ $\overleftrightarrow{JA}$ (-1) $\overline{AJ}$

(c) $\overline{EG} \cup \overrightarrow{FE}$ $\overrightarrow{GE}$

(d) $\angle EFC \cap \angle DCF$ $\overline{CF}$

(e) $\angle GFC \cap \angle JFG$ $\overrightarrow{FG}$ (-1) $\overline{FG}$

2 ea

4. Referring again to the diagram, use correct notation to provide your own examples of the requested objects.

(a) A transversal $\overleftrightarrow{AJ}$

(b) Four collinear points A, C, F, J

(c) A pair of vertical angles having $C$ as a vertex $\angle ACD$, $\angle BCF$

(d) The sides of an acute angle having $G$ as a vertex $\overrightarrow{GF}$, $\overrightarrow{GC}$

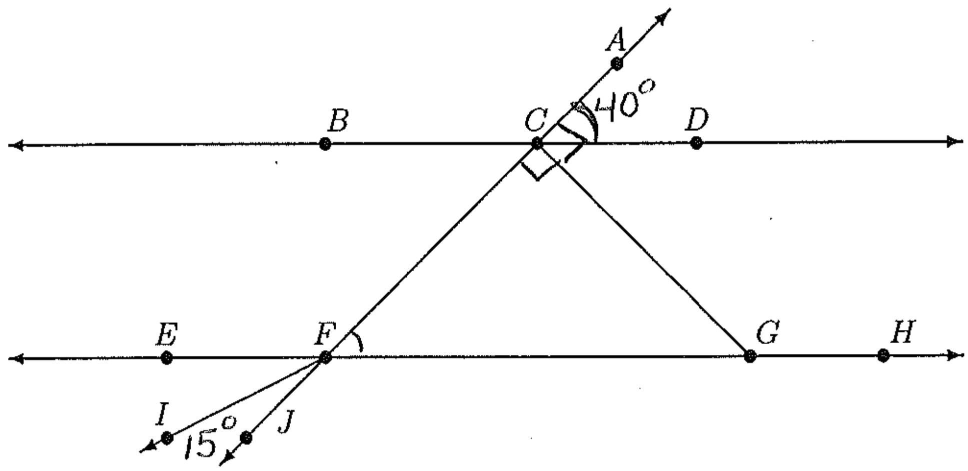
(e) A pair of adjacent angles that are not a linear pair $\angle ACD$, $\angle DCG$

or $\angle DCG$, $\angle GCF$

or $\angle EFI$, $\angle JFI$

16/16

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




5 (a) $m(\angle CGF)$

$\boxed{50^\circ}$

∡FCG is a right angle because $\overleftrightarrow{AJ} \perp \overleftrightarrow{CG}$.
∡CFG and ∡ACD are corresponding angles, so both measure 40°.
∡CGF is the remaining angle of △CGF, so it measures 180° − (90° + 40°) = 50°

3 (b) $m(\angle CGH)$

$\boxed{130^\circ}$

∡CGH is supplementary to ∡CGF (they form a linear pair), so m(∡CGH) = 130°.

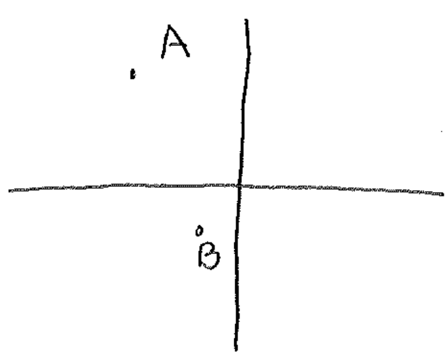
5 (c) $m(\angle EFI)$

$\boxed{25^\circ}$

∡EFJ and ∡ACD are alternate exterior angles, so both measure 40°.
∡IFJ takes up 15° worth of ∡EFJ, so ∡EFI makes up the remaining 25°.

3

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.




Q II
Q III
negative x-axis

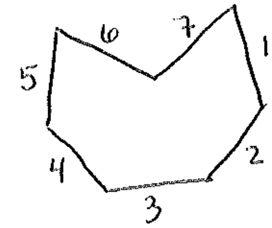
3ea

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

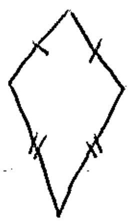
-2 lead bad quality

(a) A closed, non-simple curve

(b) A non-convex heptagon




(c) A kite that is not a rhombus



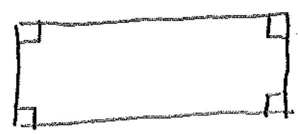
(d) A square that is not a rhombus

not possible -
all squares are rhombuses (because their sides are all congruent)

(e) A right obtuse triangle

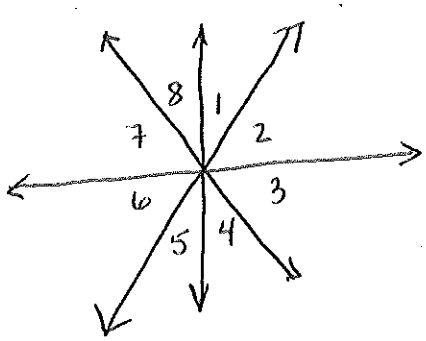
not possible -
the interior angle total of a triangle cannot exceed $180^\circ$.
($90^\circ$ plus a number greater than $90^\circ$ exceeds $180^\circ$)

(f) A quadrilateral that is equiangular but not equilateral



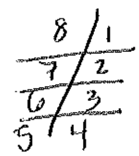
(non-square rectangle)

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




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

not possible -
4 parallels create the fewest regions; 5
"Tweak" just one and you'd make 8 regions.
Nothing in between is possible.



$\frac{20}{20}$

8. (a) How large is each interior angle of a regular 45-gon? Either show clear computational work or else explain your reasoning verbally.

4

The interior angle total is $43 \cdot 180^\circ = 7,740^\circ$
Share this equally among the 45 angles to get
$\boxed{172^\circ \text{ apiece.}}$

4

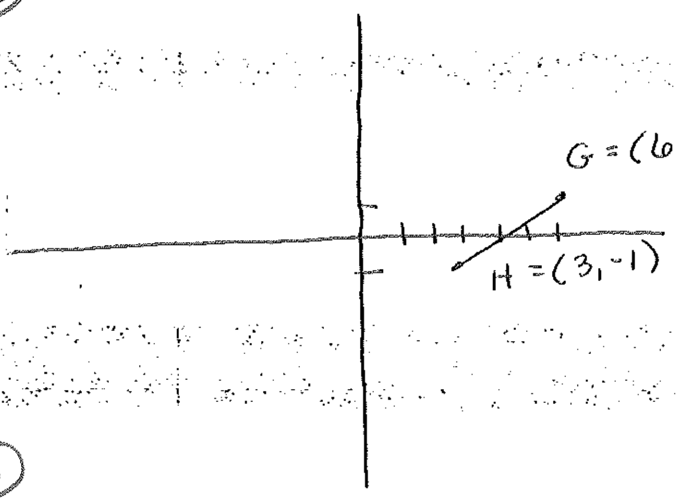
(b) A convex $n$-gon has an interior angle total of $12,780^o$. How many sides does it have? Either show clear computational work or else explain your reasoning verbally.

The total $12,780^\circ$ comes from $(n-2)\cdot 180^\circ$ or
$n-2$ triangles. Divide to find that
$n-2 = 71.$ $\boxed{n = 73 \text{ (sides)}}$

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 $\overline{GH}$. Show clear work, but you need not explain.

6

(2) slope
(2) to/for




G to H: down 2
back 3

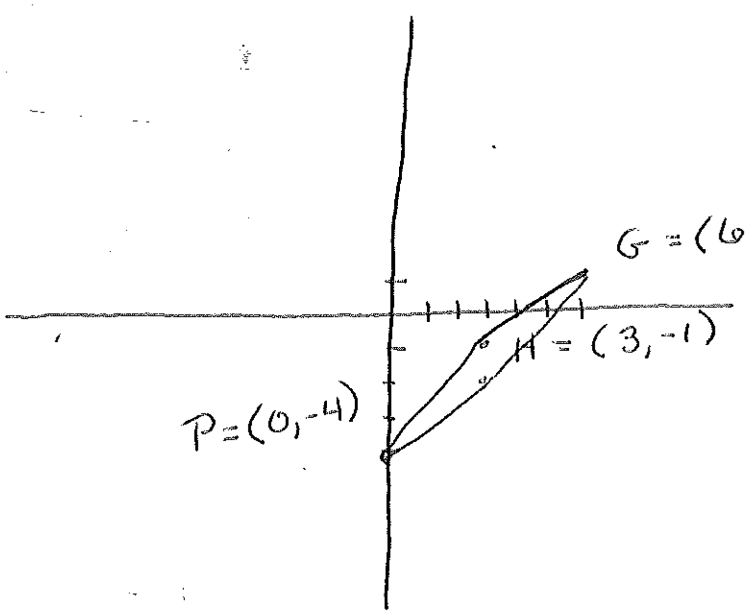
Do that twice more from H (to have done it 3 times total)

$I = (-3, -5)$

(also $I = (15, 7)$ works)

6

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.

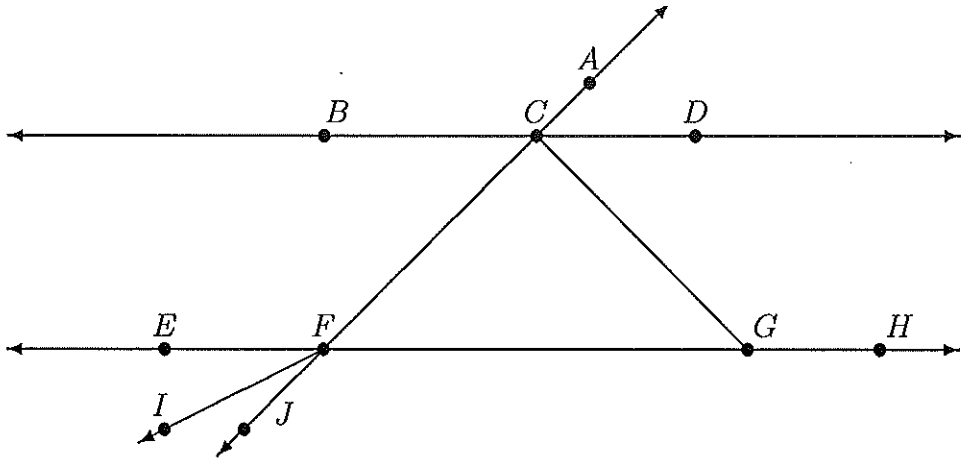



H to G is forward 3, up 2.

Count out the same amount from P to keep $\overline{GH} \parallel \overline{PQ}$:

$Q = (3, -2).$

$Q = (9,4)$ and $Q = (-3,-6)$ are also correct.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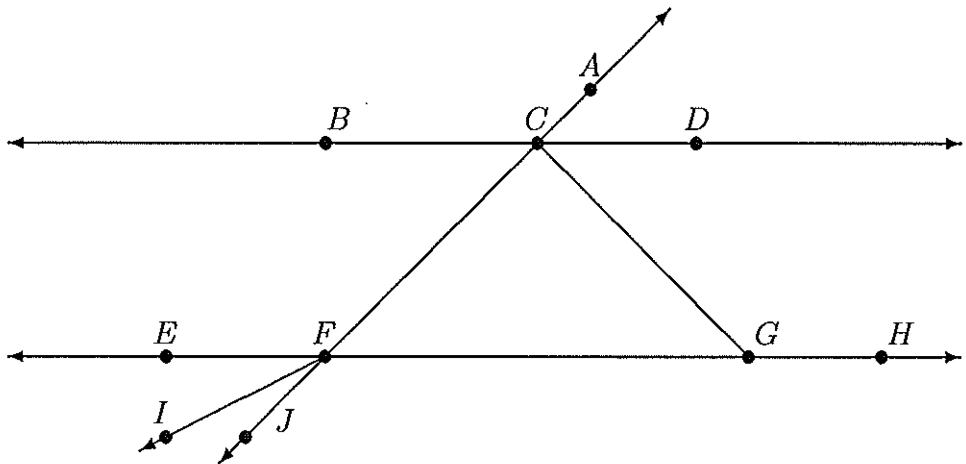
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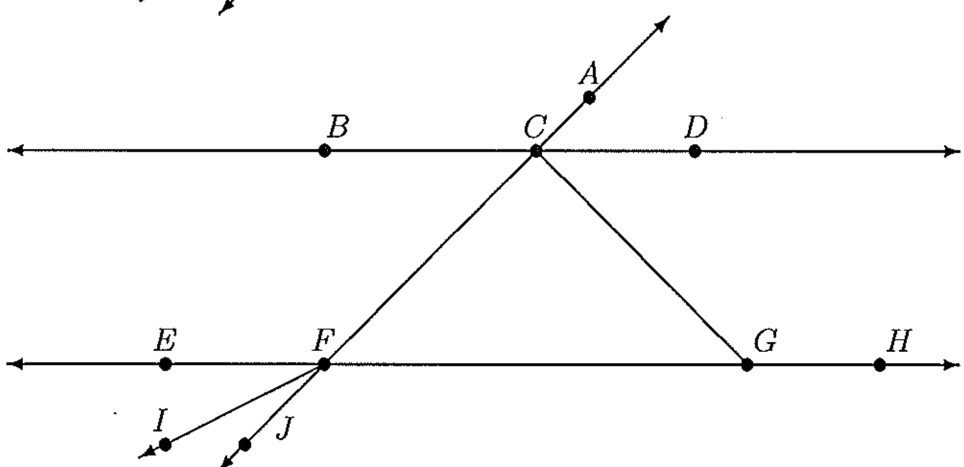
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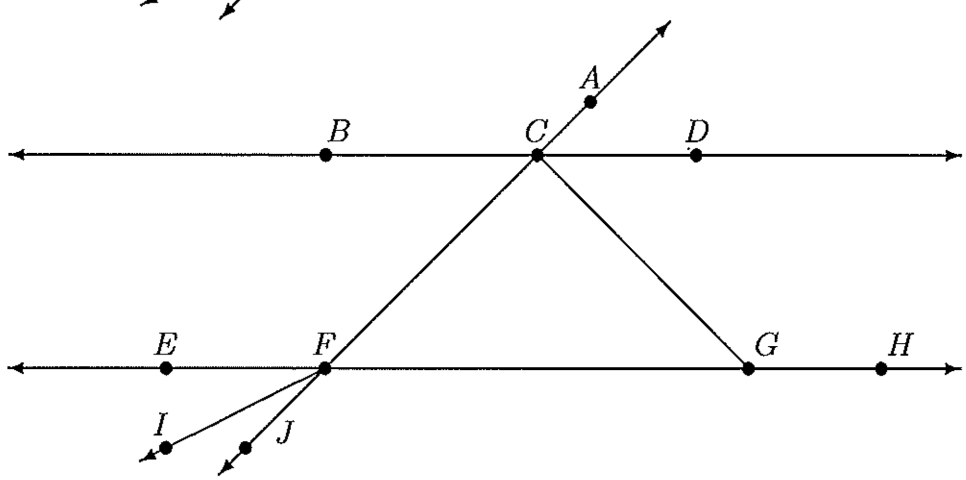
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