Math 118 - Dr. Miller - Final Exam - Spring 2006

1. *[6 pts - 1 each]* In each blank, write the most reasonable choice from among the numbers 0.001, 0.01, 0.1, 1, 10, 100, or 1000. You may re-use a number if you wish.

   (a) The thickness of a penny is about _____ cm.

   (b) The distance from here to Pittsburgh is about _____ km.

   (c) A paperclip weighs about _____ g.

   (d) Our table dividers weigh about _____ kg apiece.

   (e) Don't touch that boiling kettle! It's _____ ^{o} C!

   (f) After baling hay, my dad always gulps a _____ ℓ glass of iced tea.

2. Convert as indicated; rounding to the nearest tenth if necessary. Show clear, organized work where needed.

   (a) *[2 pts]* Convert 4 tons and 800 pounds to tons.

   (b) *[2 pts]* Convert 17.6 yards to feet.

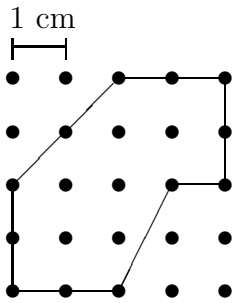
   (c) *[2 pts]* Convert 3.67 hg to cg.

   (d) *[4 pts]* That carpet costs $16 per square yard. How many cents is that per square inch?

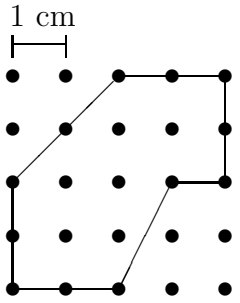
   (e) *[8 pts]* I've lost 32 pounds (*hurray!*) over the past 17 weeks. How many grams per hour is that? (Note that one kilogram equals 2.2 pounds.)

3. (a) *[3 pts]* Briefly explain the difference, conceptually, between the area and the perimeter of a shape.

(b) *[6 pts]* Compute the area of the figure below. Show clear work; round to the nearest tenth as needed. (Counting blocks is not sufficient.)

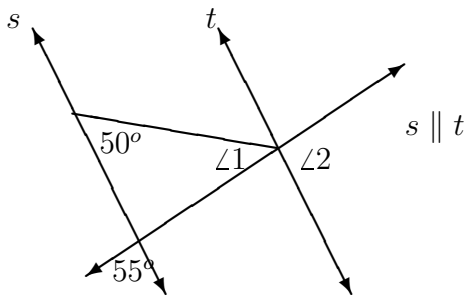


(c) *[6 pts]* Compute the perimeter of the same figure (reproduced below). Show clear work; round to the nearest tenth as needed.



4. *[12 pts - 6 each]* Find both the total surface area and the total volume of a circular cylinder 15 cm high and 10 cm in diameter. Show clear work, indicating which is which, and rounding your answers to the nearest tenth as needed.

5. *[8 pts]* Find the measurements of the two numbered angles in the diagram below, clearly and completely explaining your reasoning for each.



6. *[16 pts - 2 each]* Write the letter corresponding to the term being defined in the appropriate blank. Some terms will not be used!

_____ two angles whose measurements total 180^o

_____ an angle whose measurement is less than 90^o

_____ a pair of opposing angles formed by two intersecting lines

_____ a polygon having 9 sides

_____ a quadrilateral having two pairs of parallel sides

_____ a quadrilateral having two distinct pairs of congruent sides

_____ the common endpoint shared by the two rays forming an angle

_____ three or more lines intersecting in the same point

(a) concurrent lines	(b) perpendicular lines
(c) skew lines	(d) bisector of an angle
(e) vertex of an angle	(f) side of an angle
(i) reflex angle	(j) acute angle
(k) obtuse angle	(l) complementary angles
(m) supplementary angles	(n) adjacent angles
(o) vertical angles	(p) heptagon
(q) nonagon	(r) dodecagon
(s) trapezoid	(t) parallelogram
(u) kite	(v) rhombus

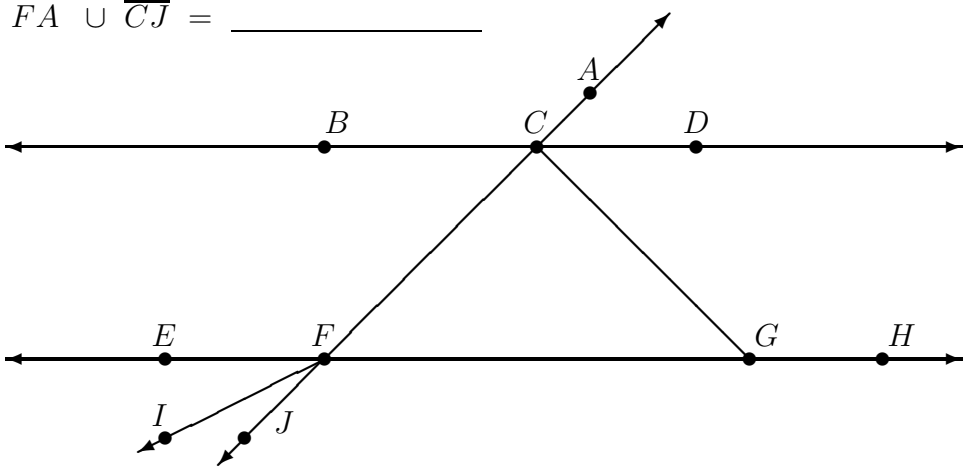
7. *[8 pts - 2 each]* Referring to the diagram given (additional copies are available up front), use correct notation to *name* the object created in each part below.

(a) $\angle CFG \cap \angle JFH =$ _____

(b) $\angle EFC \cap \angle DCJ =$ _____

(c) $\overrightarrow{FA} \cup \overrightarrow{FH} =$ _____

(d) $\overrightarrow{FA} \cup \overline{CJ} =$ _____

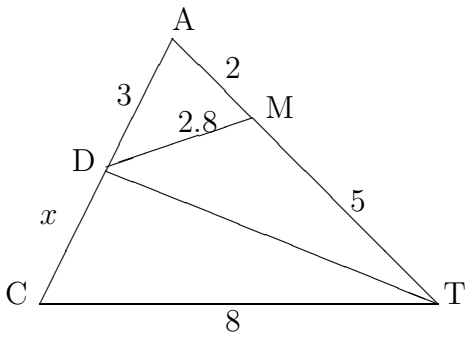


8. *[5 pts]* Determine the number of diagonals in a regular 11-gon, explaining thoroughly how you know. (If you use a memorized formula, you must explain how this formula is derived.)

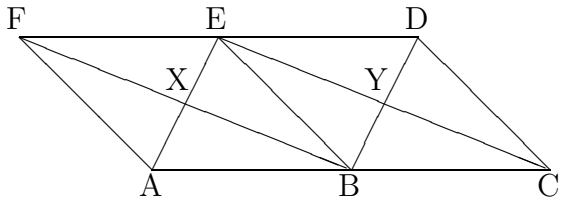
9. *[4 pts]* What does the acronym ASA *mean*? (Note: I am **not** just asking what words the letters stand for.)

10. *[5 pts]* Two rectangles are similar. The perimeter of one is 18 while that of the other is 90. If the area of the smaller is 18.81 square units, find the area of the larger. Show clear work, but you need not explain.

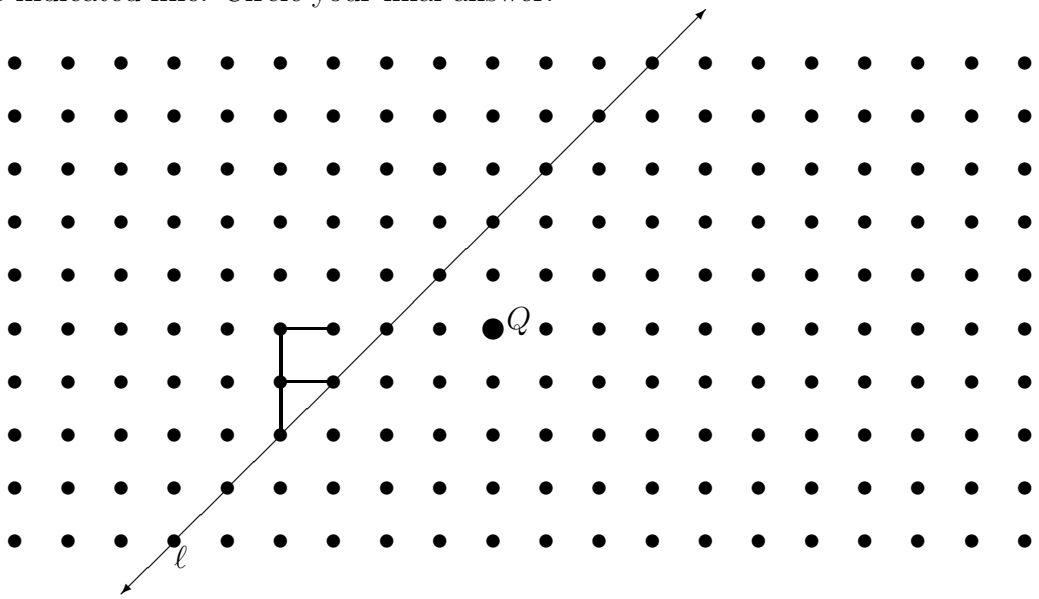
11. *[8 pts]* In the figure, $\triangle CAT \sim \triangle TMD$. Show work in finding the missing length x, rounded to the nearest tenth.



12. *[8 pts]* Given that $\triangle XEB \cong \triangle YEB$ and $\overline{AE} \cong \overline{CE}$ in the diagram below, specify a *second* pair of congruent triangles. Thoroughly explain how you arrived at your conclusion.



13. (a) *[6 pts]* Rotate the "F" 90^o clockwise around point Q, then reflect the result through the indicated line. Circle your final answer.



(b) *[2 pts]* Name the other two rigid motions that were *not* required in the problem above.

14. Draw examples of the following, if possible. If not, explain why not.

(a) *[3 pts]* a shape that has rotational symmetry but not reflectional symmetry

(b) *[3 pts]* a shape that has both translational and reflectional symmetry

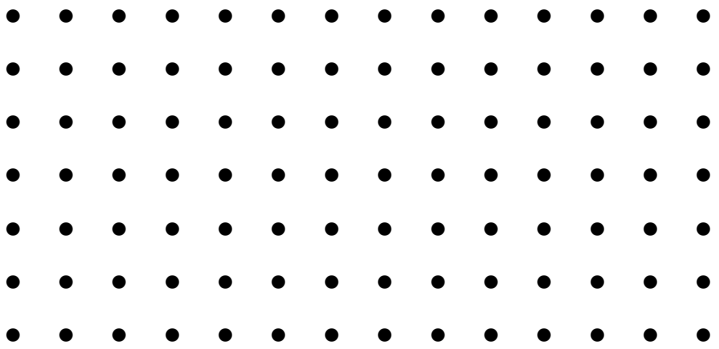
(c) *[3 pts]* a shape that has at least two lines of symmetry

(d) *[2 pts]* Does your shape in part 14c have rotational symmetry? Explain.

15. *[6 pts - 3 each]* Draw and label examples on the grid of the following, if possible. If not, explain why not.

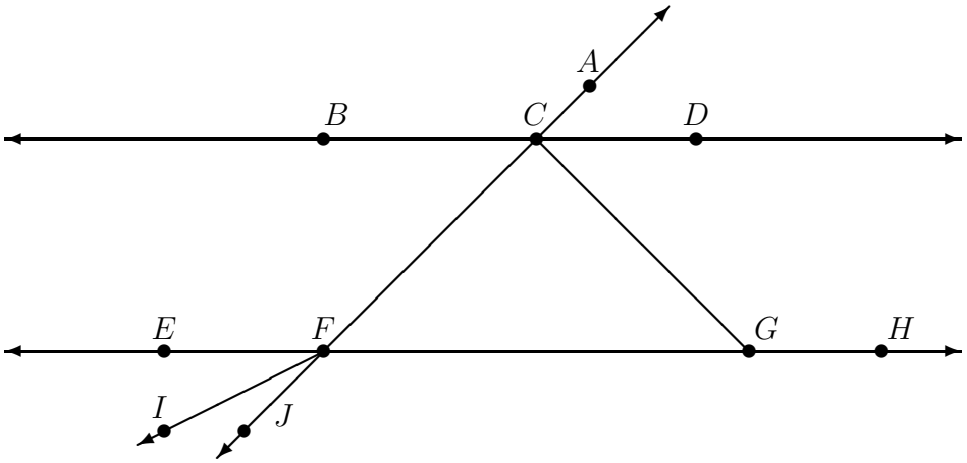
    (a) a kite that is not a rhombus (label with an "A" inside)

    (b) a quadrilateral that is equiangular but not equilateral (label with a "B" inside)



16. (a) *[4 pts]* Let $A = (3, 5)$ and $B = (0, -1)$. Find the coordinates of a point C on $\overleftrightarrow{AB}$ for which $\overline{AC}$ is twice as long as $\overline{AB}$. Clearly indicate your answer! (Grid paper is available up front.)

    (b) *[8 pts]* Let $A = (3, 5)$ and $B = (0, -1)$. Find the coordinates of a point R for which $\triangle ABR$ is an isosceles right triangle. You may position the right angle at any vertex you like. Clearly indicate your answer! (Grid paper is available up front.)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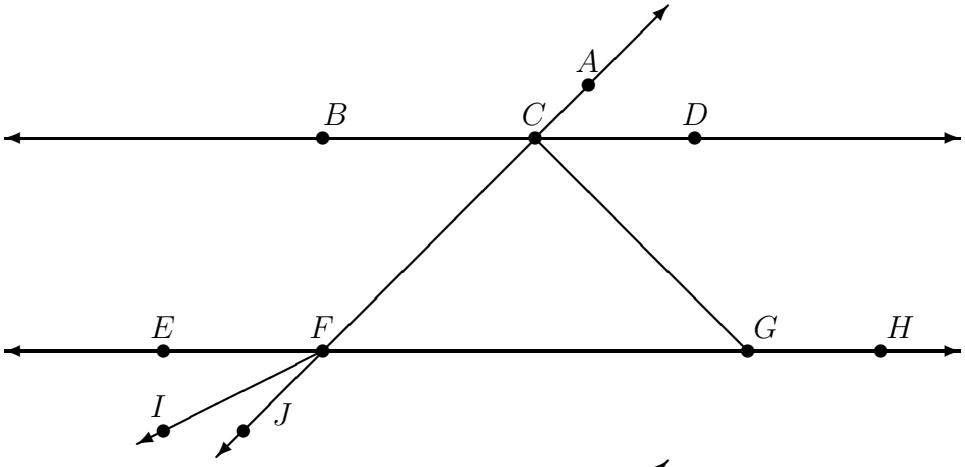
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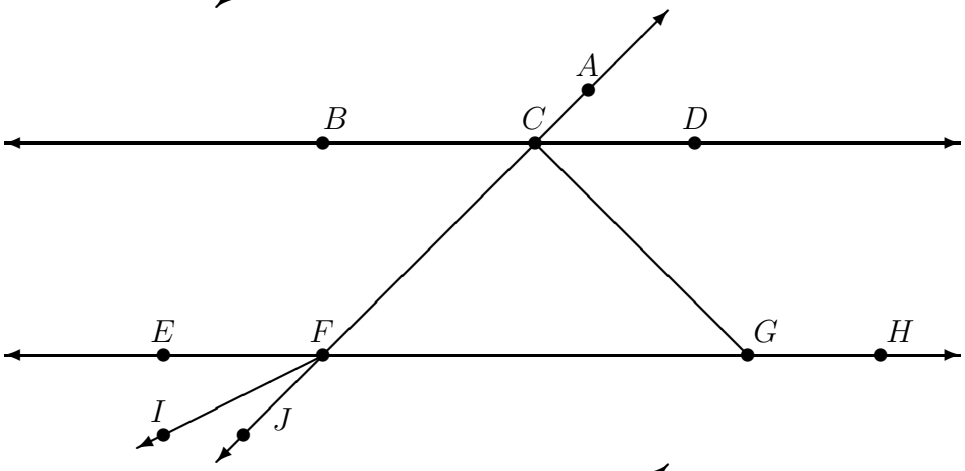
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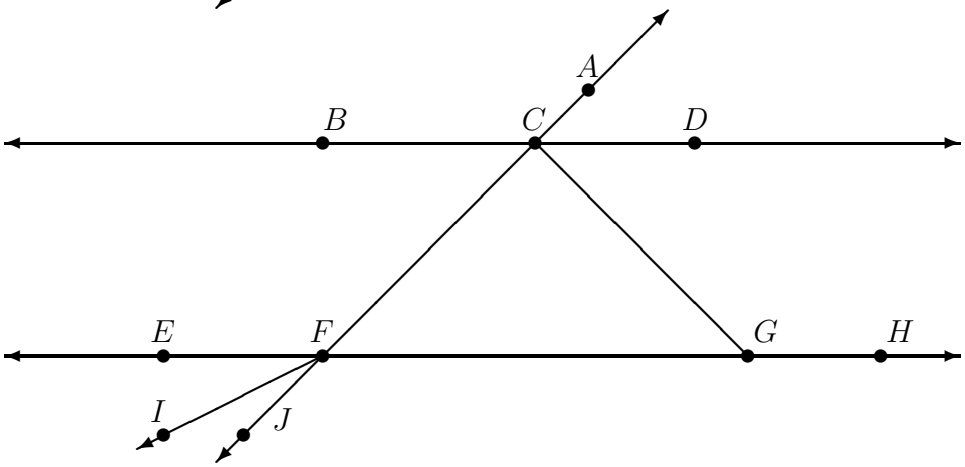
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