

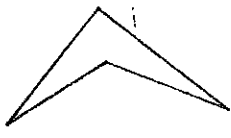


Math 310, Fall 2008, Exam 2, Version B

Name:

Show all work.

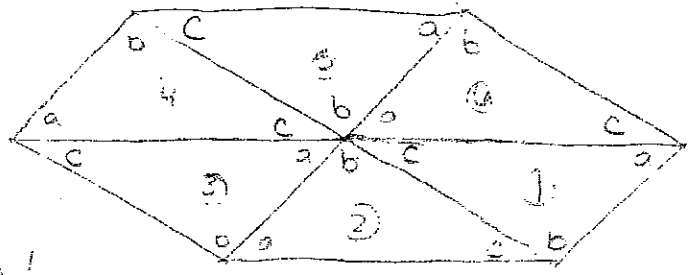
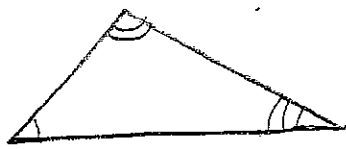
- 1. (4 points) Draw a concave quadrilateral.



- 2. (4 points) Draw a figure that is not a polygon.



- 3. (8 points) Draw a scalene triangle. Can your triangle be used to tessellate the plane? If so, draw enough of the pattern to show this (be precise and use tracing paper). If not, explain why.



$a + b + c = 180^\circ$ in a Δ
 $2(a + b + c) = 360^\circ$ for a \angle

Yes, any triangle can be used to tessellate the plane because all of their interior angles add up to 180° . And 180° can go into 360° without gaps or overlaps!

- 4. (4 points) Complete the following definition.

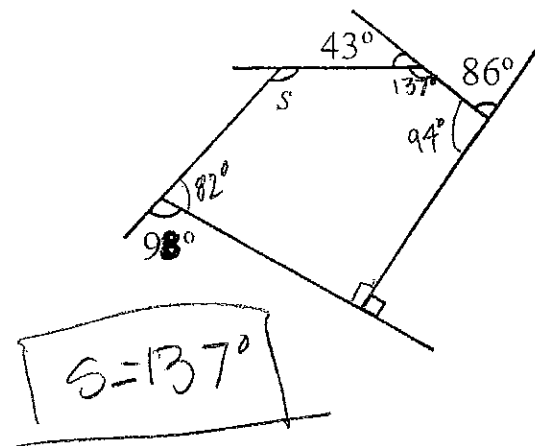
A polygon is regular if

i) all side lengths are \cong

and

ii) all int/ext. \angle 's are \cong

5. (8 points) Find s in the following polygon. Lines that appear straight are straight.



$$180 - 43 = 137$$

$$180 - 86 = 94$$

$$180 - 98 = 82$$

$$\begin{array}{r} 137 \\ + 94 \\ \hline 231 \\ + 82 \\ \hline 313 \\ + 90 \\ \hline 403 \end{array}$$

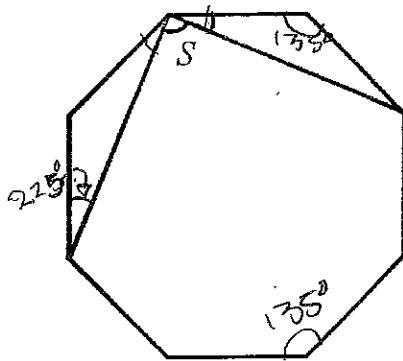
$$180(5-2) = 540$$

$$180 \times 3 = 540$$

$$540 - 403 = 137$$

$$\begin{array}{r} 403 \\ + 137 \\ \hline 540 \end{array}$$

6. (10 points) The polygon below is a regular octagon. Find s .



$$180(8-2) = 1080$$

$$180 \times 6 = 1080 \text{ total}$$

$$\frac{1080}{8} = 135$$

$$\frac{180 - 135}{2} = \frac{45}{2} = 22.5$$

$$135 - (22.5 \times 2) = 90$$

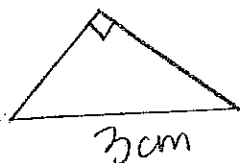
$$135 - 45 = 90$$

$$90 = s$$

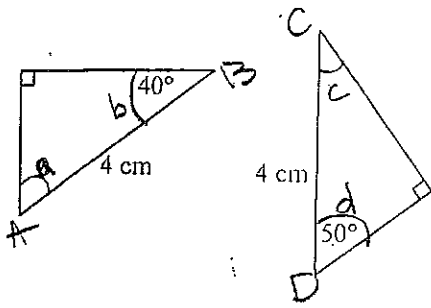
$$s = 90^\circ$$

7. (5 points) If two triangles have interior angles which measure 45 degrees, 45 degrees and 90 degrees and both triangles have a side of length 3cm, are the two triangles ^{always} congruent? If so, explain why. If not, give an example that shows it.

No



8. (5 points) Determine whether the triangles pictured are congruent. If they are congruent, say which test you used to determine this. (Figures are not necessarily to scale.)



$$a = 180 - (90 + 40) = 50^\circ$$

$$c = 180 - (90 + 50) = 40^\circ$$

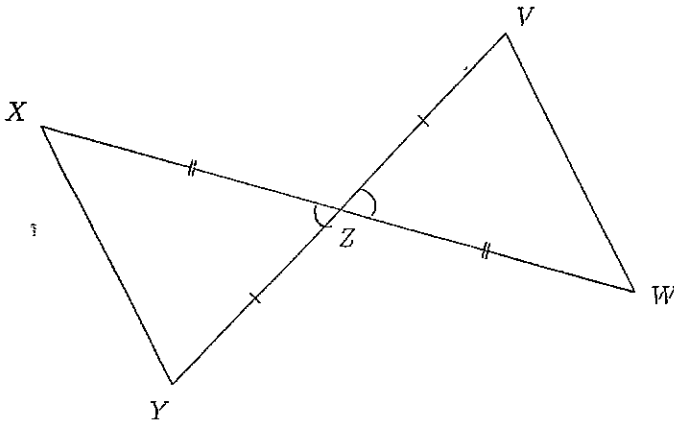
$$\angle a \cong \angle d$$

$$\angle b \cong \angle c$$

$$\overline{AB} \cong \overline{DC}$$

Yes, by ASA test

9. (10 points) Give a 'teacher's solution' to show that angle X is congruent to angle W in the figure below. (Hint: First show that the triangles are congruent...)



$\triangle YZX \cong \triangle VZW$ by
the SAS test

Since

$$\overline{YZ} \cong \overline{VZ} \text{ (given)}$$

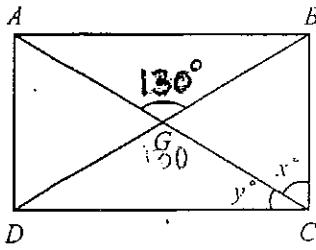
$$\angle YZX \cong \angle VZW \text{ (vertical } \angle\text{'s)}$$

$$\overline{XZ} \cong \overline{WZ} \text{ (given)}$$

\therefore CPCTC show that

$$\underline{\underline{\angle X \cong \angle W !}}$$

11. (8 points) $ABCD$ is a rectangle. Find the values of x and y .



$$180 - 130 = 50$$

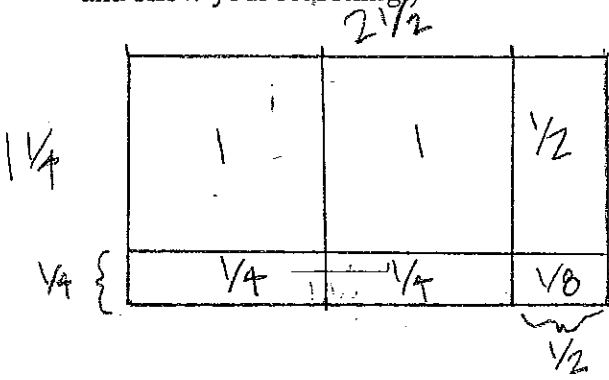
$$50 \div 2 = 25 = y$$

$$90 - 25 = 65 = x$$

$$y = 25^\circ$$

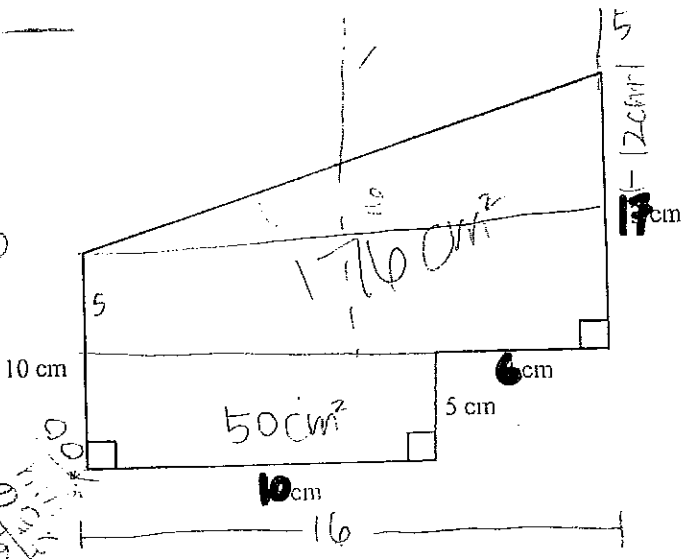
$$x = 65^\circ$$

12. (6 points) Use an area model to justify the fact that $2 \frac{1}{2} \times 1 \frac{1}{4} = 3 \frac{1}{8}$. (Draw a diagram and show your reasoning.)



$$1 + 1 + \frac{1}{2} + \frac{1}{4} + \frac{1}{4} + \frac{1}{8} = 3 \frac{1}{8}$$

13. (12 points) Find the area and perimeter of the given composite figure.



$$17 + 5 = 22$$

$$\begin{array}{r} 176 \\ + 50 \\ \hline 226 \end{array}$$

$$\text{AREA} = 226 \text{ cm}^2$$

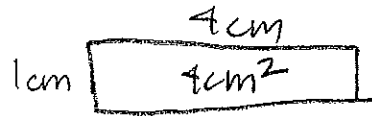
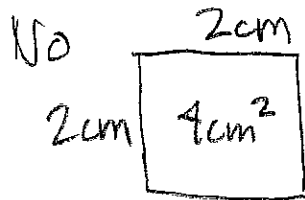
$$\text{PERIMETER} = 68 \text{ cm}$$

Handwritten notes on the left side of the page, including calculations like $10^2 + 16^2 = 20^2$ and $100 + 256 = 356$.

right \triangle

14. (5 points) Fill in the blank: "In a right triangle, the side opposite the ~~right angle~~ is called the hypotenuse."

15. (6 points) If two figures have the same area, must they also (always) have the same perimeter? If so, explain why. If not, give a counterexample and show that your counterexample works!



$$P = 8 \text{ cm}$$

$$P = 10 \text{ cm}$$

same areas, different perimeters!

16. (6 points) Use tracing paper to find the image of the following pentagon after a reflection about line m . (Be precise and put your answer on this page.)

