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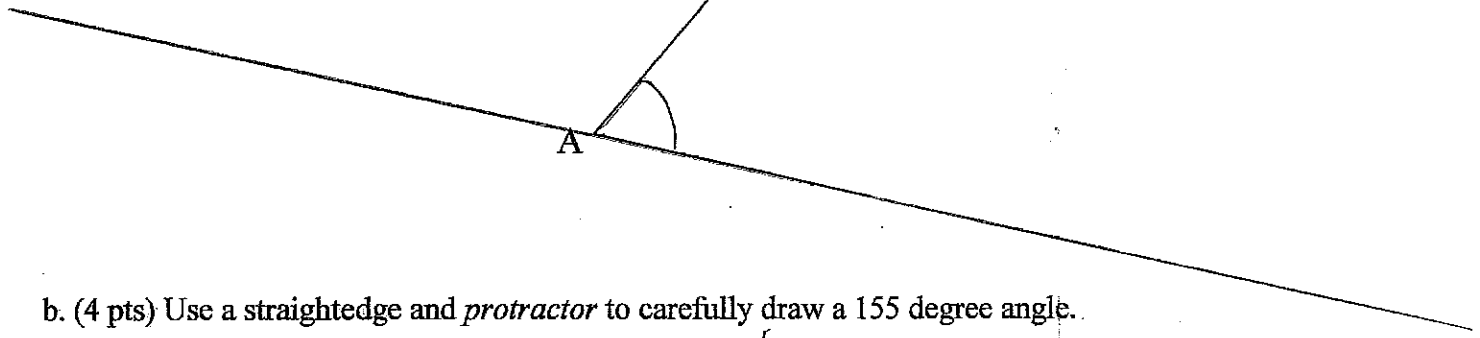
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**Math 310 Spring 2009, Exam 1, Version A**

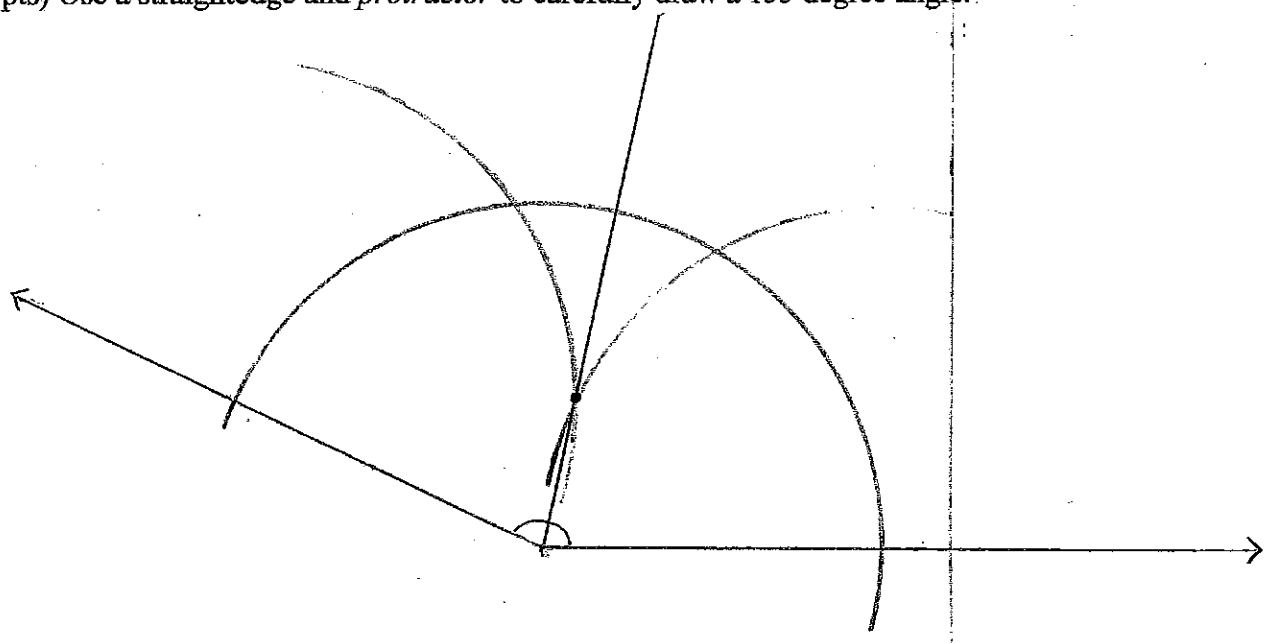
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~~XXXXXXXXXX~~

1) a. (3 pts) Use your protractor to precisely measure angle A given below.

62°



b. (4 pts) Use a straightedge and *protractor* to carefully draw a 155 degree angle.



c. (5 pts) Use a straightedge and compass ONLY (no protractor!) to carefully bisect the 155 degree angle you drew in part (b). Show your work above and show ALL construction marks.

LOOK ABOVE

12

2) (3 pts each) Which of the following could be lengths of the sides of a triangle? In each case, explain your answer.

a. 5 cm, 4 cm, 1 cm

This cannot be a triangle. In order to have a triangle, the longest side should be smaller than the other two remaining sides added together. In this case 5 is the biggest, and the remaining sides 4 and 1, make 5 making it equal, 5 and 5. Therefore you wouldn't have a triangle, you would have a line on top of another line.

← [more on back]

b. 6 cm, 8 cm, 4 cm

Yes you will have a  $\Delta$ . The longest measure 8 is smaller than the two remaining sides, making 10. This makes a triangle because the longest side measure is smaller than the sum of the 2 remaining sides. [more on back]

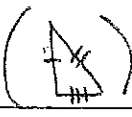
3) (2 pts each) Fill in the blanks.

a. Two angles are supplementary if the sum of their measures is 180 degrees.


b. Two angles are complementary if the sum of their measures is 90 degrees.

4) (3 pts each) Complete the following definitions:

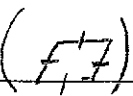
a. A scalene triangle is a triangle in which

none of the side measures are congruent ()

b. A trapezoid is a quadrilateral in which

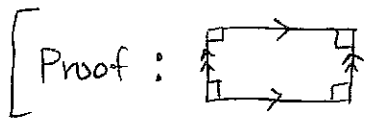
only two sides are parallel ()

c. A rhombus is a

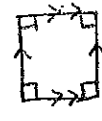
parallelogram where all sides are congruent ()  
and 2 sides are parallel and the remaining 2 sides are also parallel.

- 5) (4 pts) Is every square a rectangle? If so, explain why. If not, draw a counterexample (i.e. a square that is NOT a rectangle).

Every square is a rectangle. Def of a rectangle is a parallelogram with  $90^\circ$  angles and 2 parallel sides and the remaining 2 also parallel. A square can only have  $90^\circ$  angles, and 2 parallel sides and the remaining 2 also parallel.



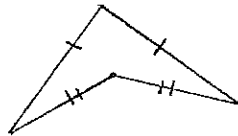
rectangle has these features, a square does also



Difference is between square + rectangle, is in a square all sides are congruent.

- 6) (4 pts) Is every kite a parallelogram? If so, explain why. If not, draw a counterexample (i.e. draw a kite that is NOT a parallelogram).

No, parallelogram needs 2 parallel sides, and remaining also parallel.



- 7) (2 pts each) Complete the following. k h d □ d c m

a.  $288 \text{ in} = \underline{24} \text{ ft} = \underline{8} \text{ yd}$

b.  $150.3 \text{ m} = \underline{15,030} \text{ cm}$

\*work on back

c.  $2213 \text{ mm} = \underline{2.213} \text{ m}$

2 eeo

d.  $8723.1 \text{ L} = \underline{8,723,100} \text{ mL}$

- 8) (5 pts) Give a Teacher's Solution to the following.

$2 \text{ L } 500 \text{ mL} + 750 \text{ mL} = \underline{3.25} \text{ L}$

1st lets put everything in mL.  $\rightarrow 2 \text{ L} \times \frac{10 \text{ dL}}{1 \text{ L}} \times \frac{10 \text{ cL}}{1 \text{ dL}} \times \frac{10 \text{ mL}}{1 \text{ cL}} = 2000 \text{ mL}$

okay so  $2 \text{ L} = 2000 \text{ mL}$  plus  $500 \text{ mL}$  we already had equals

$2500 \text{ mL}$ . And we want to add  $750 \text{ mL}$  more so,

$$\begin{array}{r} 2500 \text{ mL} \\ + 750 \text{ mL} \\ \hline 3250 \text{ mL} \end{array}$$

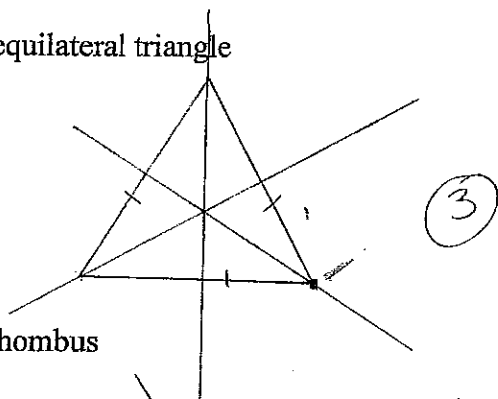
we get  $3250 \text{ mL}$ , the answer is asked for in L. so let's change mL into L.

$$3250 \text{ mL} \times \frac{1 \text{ cL}}{10 \text{ mL}} \times \frac{1 \text{ dL}}{10 \text{ cL}} \times \frac{1 \text{ L}}{10 \text{ dL}} = 3.25 \text{ L}$$

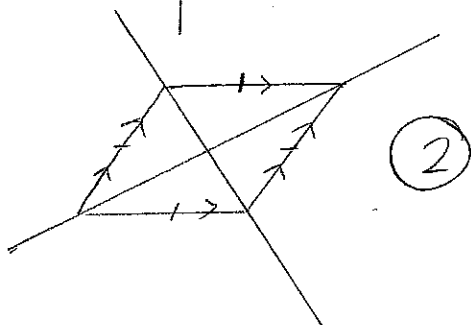
So we get  $3.25 \text{ L}$

9) (3 pts each) In general, how many lines of symmetry does each of the following figures have? Draw sketches showing the figure and *all* lines of symmetry.

a. equilateral triangle



b. rhombus



10) (3 pts each) Determine whether each of the following figures has rotational symmetry. In each case, determine the smallest angle for which the figure has rotational symmetry and the *order* of the rotational symmetry. If the figure does not have rotational symmetry, write "none."

a. equilateral triangle

3 order rotational symmetry  
at angles 120, 240, and 360

$$\begin{array}{r} 60 \\ 3 \overline{) 180} \\ \underline{18} \\ 00 \end{array}$$

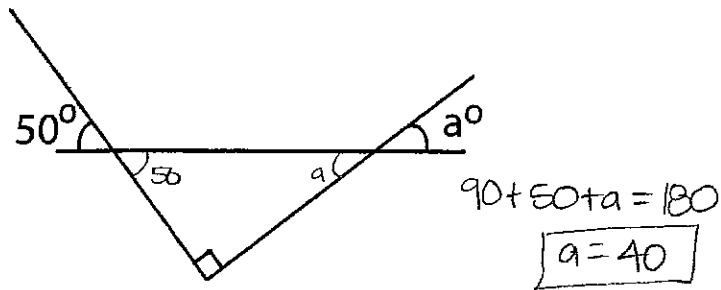
$$\begin{array}{r} 120 \\ 3 \overline{) 360} \\ \underline{3} \\ 6 \\ \underline{6} \\ 00 \end{array}$$

b. rhombus

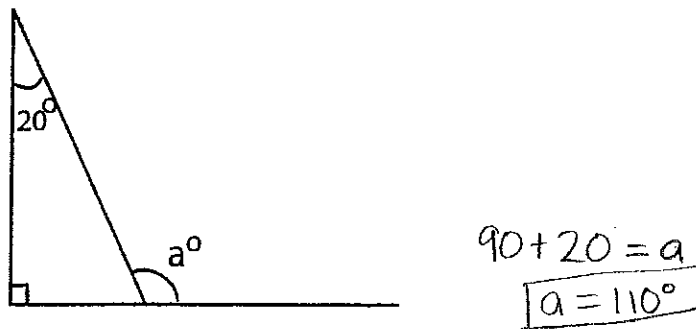
order 2 rot sym  
at angles 180° + 360°

11) (3 pts each) In each of the following, find the value of a.

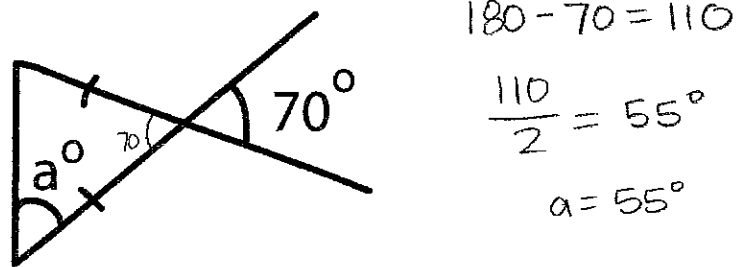
a.



b.



c.



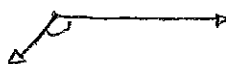
12) (6 pts) Sketch a clock face showing 7:15 and calculate the *smaller* angle formed by the clock hands.

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$127.5$

$$\begin{array}{r} 30 \\ 12 \overline{) 360} \\ \underline{36} \phantom{0} \\ 0 \phantom{0} \end{array}$$

9



3  
> 30°

$$\begin{array}{r} 30 \\ +30 > 60 \\ +30 > 60 \\ +30 > 60 \\ +7.5 \\ \hline \end{array}$$

8

4

$$\begin{array}{r} 7.5 \\ 4 \overline{) 30} \\ \underline{28} \phantom{0} \\ 20 \phantom{0} \end{array}$$

7.5

30°

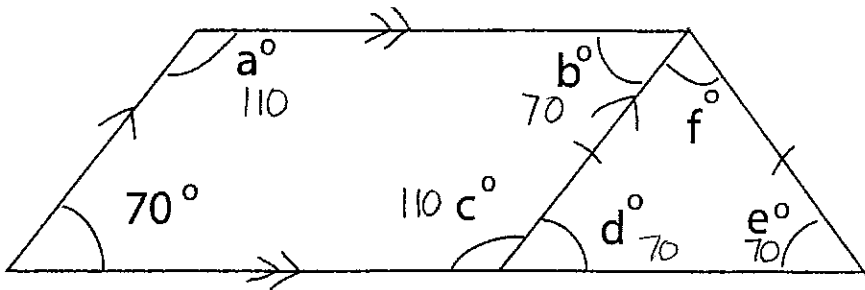
5

30°

$$\begin{array}{r} 120 \\ + 7.5 \\ \hline 127.5 \end{array}$$

$15$

13) (8 pts) Give a Teacher's solution to find the missing angles in the figure below.



at  $70^\circ = 180$   
 $a = 110$

int  $\angle$ 's of parallelogram

$110 + b = 180$   
 $b = 70$

int  $\angle$ 's of parallelogram

$70 + c = 180$   
 $c = 110$

int  $\angle$ 's of parallelogram

$110 + d = 180$   
 $d = 70$

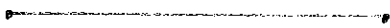
$\angle$ 's on a line

$d = e$   
 $d = 70$   
 $e = 70$

base  $\angle$ 's of isoc  $\Delta$

$70 + 70 + f = 180$   $\angle$  sum of  $\Delta$   
 $140 + f = 180$   
 $f = 40$

14) a. (2 pts) Use your ruler to draw a line segment that is 5 centimeters long.



b. (3 pts) Measure the line segment you drew in part (a) in inches. It is roughly 2 inches long. Therefore, 1 inch is approximately 2.5 centimeters long.

c. (8 pts) Arrange the following lengths in order, beginning with the shortest.

1 yd, 80 cm, 2 ft, 35 in, 90 cm, 80 cm, 60 cm, 87.5 cm

$1 \text{ yd} = 3 \text{ ft} = 36 \text{ in}$

$36 \text{ in} \times \frac{2.5 \text{ cm}}{1 \text{ in}} = 90 \text{ cm}$

$2 \text{ ft} \times \frac{12 \text{ in}}{1 \text{ ft}} = 24 \text{ in}$

$24 \text{ in} \times \frac{2.5 \text{ cm}}{1 \text{ in}} = 60 \text{ cm}$

$35 \text{ in} \times \frac{2.5 \text{ cm}}{1 \text{ in}} = 87.5 \text{ cm}$

$1 \text{ yd} = 90 \text{ cm}$

2 ft, 80 cm, 35 in, and 1 yd

60 cm, 80 cm, 87.5 cm, 90 cm

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