Math 141
Sample Proficiency Exam **Name_____**

The following is a sample proficiency exam for the UIC Math 141 course. If you have completed a comparable course at another institution (i.e. Math for Teachers II) and pass the proficiency exam, you will fulfill the requirements for the Math 141 course at UIC.

Show your work. You may use a calculator. Each problem is worth 10 points.

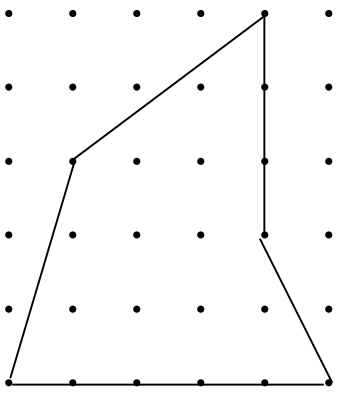
1. Here are the ages of the people in the Johnson family: {3, 6, 8, 11, 15, 27, 33}
   Here are the ages of the people in the Whitmore family: {1, 2, 3, 11, 12, 33, 34}
   a. Draw parallel box and whisker graphs for the two data sets.

   b. How would you use these graphs in a discussion with your students?

2. The probability of rain on any random day is .3. Find the probability that it rains precisely 2 days out of a 4-day stretch. Show your work.

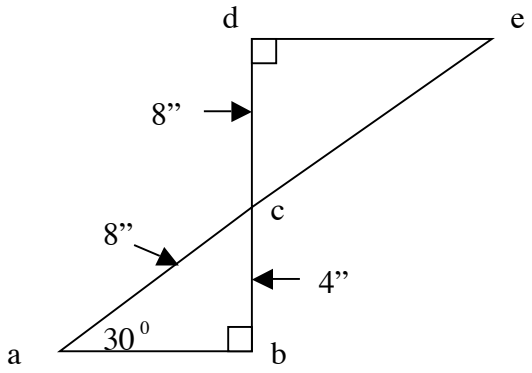
3. Find the perimeter of the polygon on this geoboard: _____

   Find the area of the polygon on the geoboard: _____



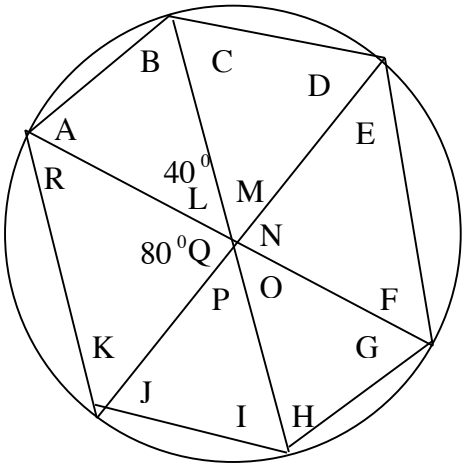
4. Find the angles and the lengths of the sides of the two right triangles.

Show your work. (Not drawn to scale.)



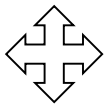
5. Here is a hexagon inscribed in a circle. The hexagon is divided into six triangles, by diameters of the circle. Two of the central angles are 40 degrees and 80 degrees. Find the interior angles of the six triangles. (Not drawn to scale)

A=_____ J =_____
B=_____ K=_____
C=_____ L=__40 0
D=_____ M=_____
E=_____ N=_____
F=_____ O=_____
G=_____ P=_____
H=_____ Q=__80 0
I=_____ R=_____

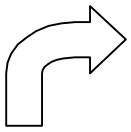


Are the opposite sides of the hexagon parallel? _____. Prove that you are correct. (You may answer the question for $\overline{CD}$ and $\overline{IJ}$.)

6. How many lines of symmetry do the following shapes have? If they have rotational symmetry, find the smallest angle of rotation.

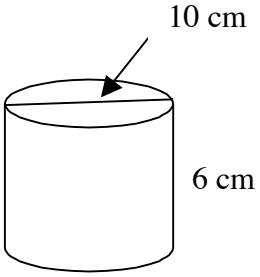
a. 

b. 

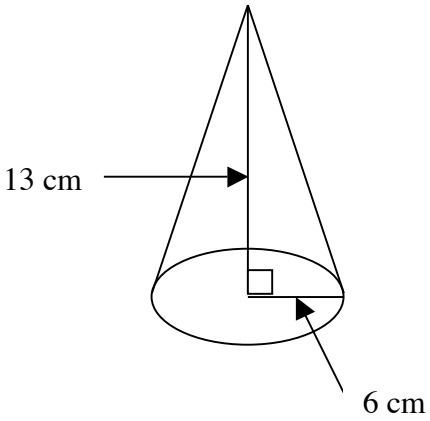
c. 

7. Wacky Containers designs different shapes to hold ice cream. Which shape would hold more? Show your work.

a.



b.



8. Thomas scored five more points than Ken who scored five more points than Jerad. The three of them had a mean score of 75. What is Thomas' score?

Abbreviated Solutions

1. a. graph
   b. The graphs show that the medians are the same for both families and the interquartile range (or dispersion) is greater for the Whitmore family.

2. .2646

3. Perimeter = $8 + \sqrt{5} + \sqrt{10} + \sqrt{13}$ units ($\approx$ 17.0039 units)
   Area = 14.5 square units

4. ce = 16”
   ab = $4\sqrt{3}$”
   de = $8\sqrt{3}$”
   $\angle$ acb = 60^0
   $\angle$ dce = 60^0
   $\angle$ e = 30^0

5. A= 70^0 J = 60^0
   B= 70^0 K= 50^0
   C= 60^0 L= 40^0
   D= 60^0 M= 60^0
   E= 50^0 N= 80^0
   F= 50^0 O= 40^0
   G= 70^0 P= 60^0
   H= 70^0 Q= 80^0
   I= 60^0 R= 50^0

6. a. 4, yes, 90^0
   b. 1, no
   c. none, no

7. Cone holds more ice cream

8. 80