Name ____

Teacher (circle): Doucette Haupt Rahman Richardson

Class block (circle): A B C D E F G H

Lexington High School
Mathematics Department
Honors Geometry
Final Exam 2006

This is a 90-minute exam, but you will be allowed to work for up to 120 minutes.

General instructions:

Your exam contains 12 computational problems; you will be graded on your work for 10 problems only. All of these problems are weighted equally. There is also a proof. This problem is required. It is worth double the value of the computational problems. The course faculty will set a letter grade scale after the tests have been graded. Show all your work and do your best to present complete and accurate solutions.

In the box below circle the 10 problems that you wish to be graded. NO OTHER WORK WILL BE CONSIDERED.

GOOD LUCK!

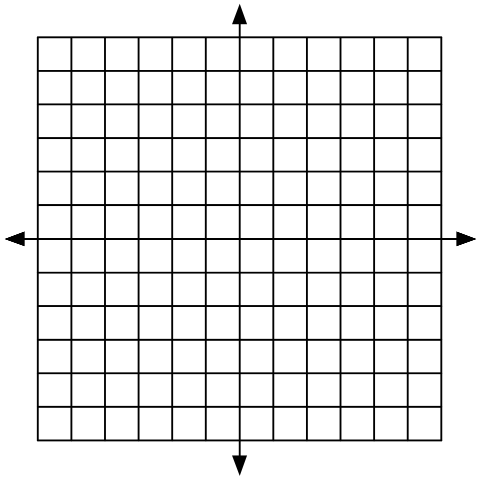
1	2	3	4	5	6
7	8	9	10	11	12

Score:_____________

Grade:____________

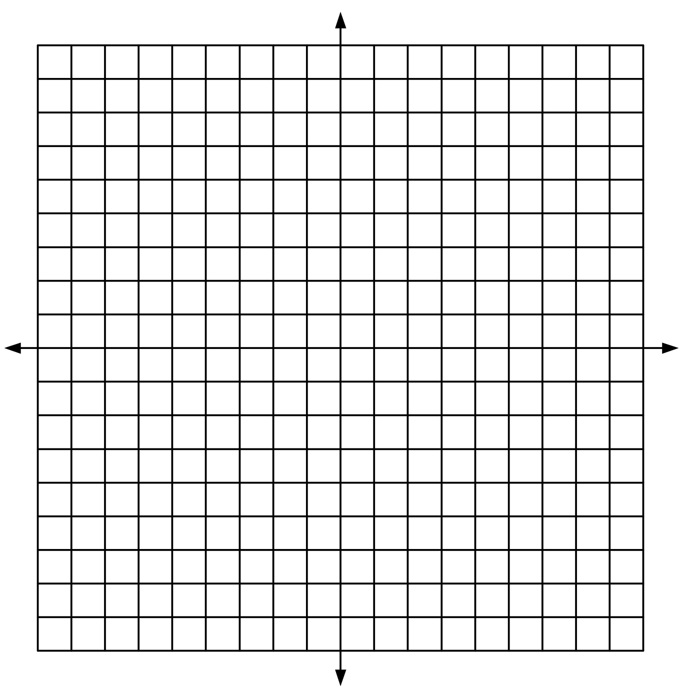
Computational Problems

1. Determine the area of the triangle with vertices at (-2, 1), (5, 0), and (2, -3).



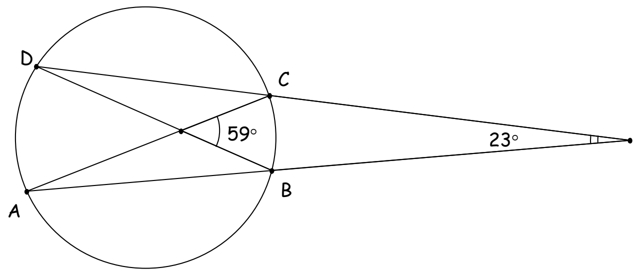
Area =

2. Determine the coordinates of the vertices of the triangle where the midpoints of the sides are at (-2, 1), (5, 2), and (2, -3).



Coordinates =

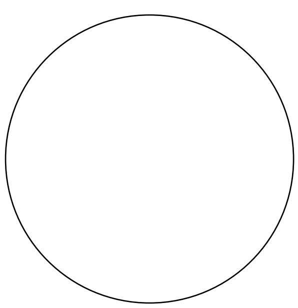
3. From the diagram, find the measure of $\overset{\frown}{AD}$ and $\overset{\frown}{BC}$.



$\overset{\frown}{AD} =$

$\overset{\frown}{BC} =$

4. T is a point on circle O and $\overline{PT}$ is a tangent of length 4. PRS is a secant (R and S are on circle O) with its external segment PR of length 2. If the distance from point O to the secant is 1, find the radius of the circle.



radius =

5. Find the ratio of the volumes of two pyramids, one of which has a square base and lateral faces consisting of equilateral triangles. The other has a base and lateral faces consisting of equilateral triangles (a tetrahedron). Let all the edges in this problem be equal.

Volume ratio =

6. A cone of radius 8 and a slant height of 12 is cut off by a plane parallel to its base and half the distance to its apex. Find the volume of the solid between the plane and the base.

Volume =

7. A sphere is inscribed in a cone whose radius is half of its slant height. A second sphere is circumscribed about the cone. Find the ratio of the **a)** radii of the spheres, **b)** the surface area of the spheres, and **c)** the volume of the spheres.

radii =

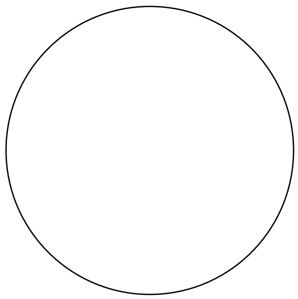
areas =

volumes =

8. Point Q is on the circumference of circle P and point P is on the circumference of circle Q. The radius of circle Q is 6. Find the area of the region common to both circle interiors (the overlap).

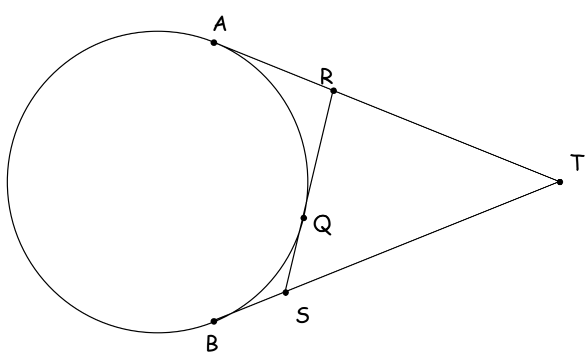
area =

9. Given a circle of radius 5, find the ratio of the perimeters of inscribed and circumscribed pentagons.



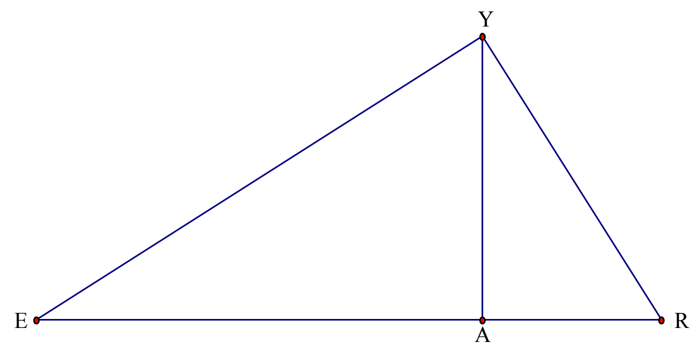
Perimeter ratio =

10. Points A and B are on a circle such that $\overline{AT}$ and $\overline{BT}$ are tangents. Q is a point on $\overset{\frown}{AB}$ and the tangent at Q intersects $\overline{AT}$ at R and $\overline{BT}$ at S. If $AT = 8$, find the perimeter of ΔRST.



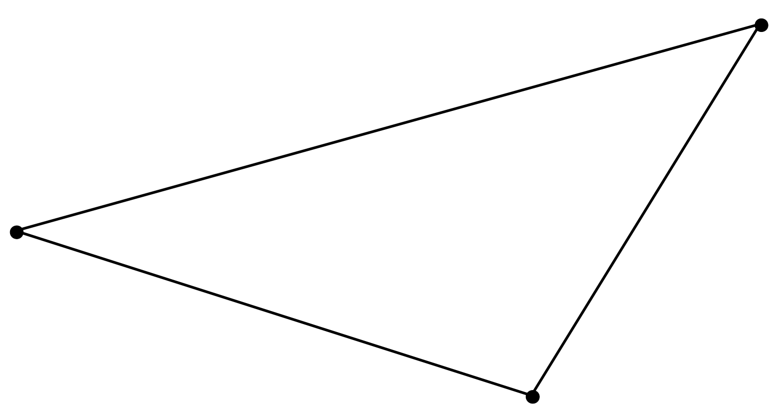
Perimeter =

11. Given the triangle below, with altitude YA, a right angle at Y and lengths YR = 15 and EA = 16, find the lengths of EY, AY and AR.



EY =
AY =
AR =

12. Use a compass and straight edge to construct the orthocenter of the triangle below.



Proof Problem

Segments AC and BD intersect proportionally. Prove that points A, B, C, and D are concyclic. The coordinates of the endpoints are (-6, -6), (-2, 2), (1, 1) and (3, -3) respectively. You are not required to use coordinate geometry to prove this conjecture. This is the proof of a theorem that you learned this year. You may not use that theorem as a reason in your proof.