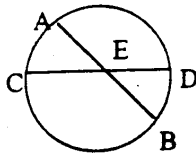
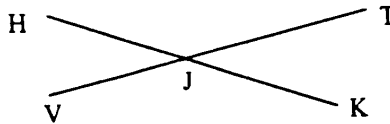


1. In the figure below, \overline{AB} and \overline{CD} are chords. The degree measure of $\angle DEB = 52$. The degree measure of Arc DB is 31. Find the degree measure of Arc AC .

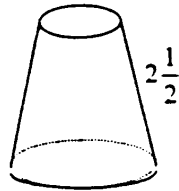


2. Judy leaves Champaign and travels straight east at 32 mph. Karl leaves from the same location one-half hour later and travels straight north at 55 mph. How many miles apart are Judy and Karl 90 minutes after Judy leaves Champaign?
3. A circle with a radius of 12.36 is inscribed inside an equilateral triangle. Find the area of the region inside the triangle but outside the circle. Express your answer as a decimal rounded to 4 significant digits.
4. Find the x-coordinate of the point at which the line $7x + 3y = 126$ intersect the x-axis. For your answer write only the x-coordinate.
5. In the figure below, the degree measure of $\angle HJV$ is $x^2 - 6x$, and the degree measure of $\angle TJK$ is $x + 18$. Find the sum of all distinct possibilities for the degree measure of $\angle HJT$.

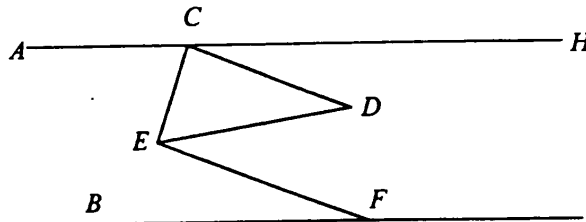


6. Points A, B, and C are collinear, and B is between A and C. If $AB = 84$, and $AC = \frac{4}{3}(CB)$, find the distance from C to B.
7. Triangle ABC is equilateral with a perimeter of 6. On the plane of the triangle, a circle with center at C passes through the midpoint of \overline{BC} . \overline{AD} is tangent to Circle C at D and D does not lie on \overline{BC} . Find the area of the portion of the quadrilateral $ABCD$ that lies in the exterior of Circle C . Express your answer as a decimal rounded to 4 significant digits.

8. By how much does the area of a rectangle with a diagonal of 30 and a side of 24 exceed the area of a right triangle with a leg of 12 and hypotenuse of 37?
9. In Triangle ABC , M is the midpoint of \overline{AB} , and $\angle ACB = 90^\circ$. If $AB = 10$ and $BC = 8$, find the perimeter of Triangle ACM .
10. Find the probability that a point selected at random in the interior of a regular hexagon is also in the interior of the inscribed circle of the regular hexagon. Express your answer as a decimal rounded to 4 significant digits.
11. In parallelogram $ABCD$, the degree measure of $\angle DCB$ is $2x + 50$, the degree measure of $\angle DAB$ is $4x$, the length of \overline{AD} is x , and the length of \overline{CD} is $x + 10$. Find the perimeter of parallelogram $ABCD$.
12. The figure shown below is a frustum of a right circular cone. The two circular bases lie in parallel planes and have respective radii of 4 and 6. The lateral edge from one base to the other base is $2\frac{1}{2}$. The volume of the frustum is $k\pi$. Find the value of k .



13. Given: $\triangle RST$ with $R(-3, 8)$, $S(3, 0)$, and $T(12, 12)$. Find, in decimal form rounded to 4 significant digits, the radius of the inscribed circle of $\triangle RST$.
14. In the plane figure below, $\overline{AH} \parallel \overline{BF}$, $\angle ACE = 74^\circ$, $\angle HCD = 62^\circ$, $\angle CED = 50^\circ$, and $\angle BFE = 53^\circ$. Find the degree measure of $\angle DEF$.



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15. In Triangle ABC , point D lies on \overline{BC} such that $\angle BAD \cong \angle CAD$. If $BC = 24$, $BD = 16$, and $AC = 6$, find AB . (COMMITTEE NOTE: Overdetermined problem.)
16. If the degree measure of the supplement of ^{The triangle could not exist.} half the complement of an angle is 5 degrees less than 4 times the degree measure of the angle, find the degree measure of the angle.
17. Triangle PRQ has vertices $P(0, 0)$, $Q(10, 0)$, and $R(5, 5)$. Find the area of the circle that passes through the triangle's orthocenter, the triangle's circumcenter, and point P . Express your answer as a decimal rounded to 4 significant digits.
18. Name the type of triangle in which 2 of the 3 altitudes of the triangle lie in the exterior of the triangle.
19. Point A lies in the interior of $\triangle BCD$ such that \overline{CA} bisects $\angle BCD$ and \overline{DA} bisects $\angle BDC$. If the degree measure of $\angle CBD$ is 80, find the degree measure of $\angle CAD$.
20. In Triangle ABC , $AB = 12$, $BC = 20$, and $AC = 24$. D lies on \overline{AC} such that $\angle ABD \cong \angle CBD$. If \overline{BE} is the median from B to \overline{AC} , find, in simplest radical form, the area of $\triangle BDE$.

A Geometry

Name S02

School _____

Correct X **2** pts. ea. =

School Code _____

ITEM ANALYSIS			
113 Papers			
Percent of Answers Correct			
1A Geometry			
1.	32%	11.	69%
2.	49%	12.	8%
3.	10%	13.	8%
4.	57%	14.	35%
5.	30%	15.	33%
6.	51%	16.	31%
7.	4%	17.	0%
8.	72%	18.	47%
9.	36%	19.	31%
10.	10%	20.	0%

Note: All answers must be written legibly in simplest form, according to that stated in the Contest Manual. Exact answers are to be given unless specified in the question. No units of measurement are required.

1. 73 (degrees optional)

11. 120

2. 73 (miles optional)

12. 38

3. 313.9 (must be this decimal)

13. 3.553 (must be this decimal)

4. 18

14. 77 (degrees optional)

5. 317 (degrees optional)

15. 12

Note: Overdeter
Problem: The tri
could not exist.

6. 252

16. 40 (degrees optional)

7. 1.551 (must be this decimal)

17. 39.27 (must be this decimal)

8. 222

18. obtuse (triangle

ITEM ANALYSIS			
120 Papers			
Percent of Answers Corn			
2A Geometry			
1.	39%	11.	79%
2.	61%	12.	11%
3.	25%	13.	17%
4.	77%	14.	64%
5.	51%	15.	39%
6.	70%	16.	49%
7.	15%	17.	2%
8.	80%	18.	51%
9.	33%	19.	44%
10.	16%	20.	0%

9. 16

19. 130 (degrees o

10. 0.9069 or .9069 (must be this decimal)

20. $4\sqrt{14}$