

SENIOR HIGH MATH LEAGUE
April 24, 2001

GROUP III Emphasis on GEOMETRY

TEST A

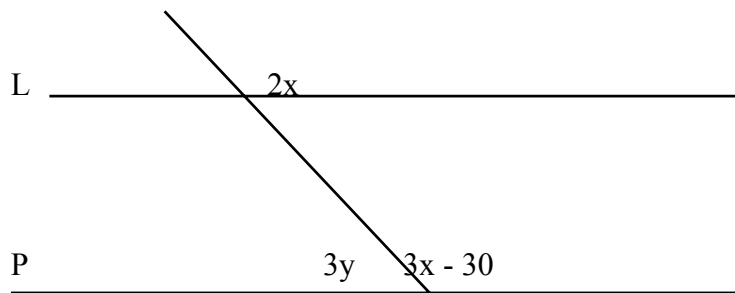
Unless otherwise stated give exact answers.

SECTION I: ONE POINT EACH

1. Find the exact area in square inches of an equilateral triangle whose base is of length 10 inches.
2. Give the smallest possible diagonal for a rectangle of area 20 square inches
3. Solve for z : $2z - 5 = 3 \{2 + [z - (4z - 1)]\}$
4. A survey of 420 people showed that 250 owned an automobile, 150 owned a house, and 100 owned both an automobile and a house. To the nearest percent, what percent of people owned an automobile only?
5. What is the area of the figure that has the points (1, 3), (3, 3), and (1, 6) as vertices?
6. True or False. Every square is also a rhombus.

SECTION II: TWO POINTS EACH

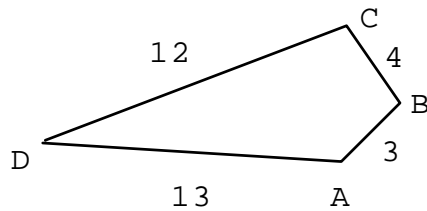
1. The sides of a triangle are 3, 5, and 6 in. Find the exact perimeter of a similar triangle whose shortest side is 10 in. The answer should be expressed as one fraction and be reduced.
2. Fill in the blank: The sum of five consecutive integers is always _____ times the third integer.
3. Find the values of x and y if the degree measures of the angles are as shown below and lines L and P are parallel.



4. Find the area of a square with diagonals of length 10ft.

5. An investor has 100 shares total of two kinds of stock: Dot Com and Big Blue Corp. Dot.Com sells for \$20 per share and Big Blue sells for \$50 per share. If the investor has \$2900 total in stock, how many shares of each does he own?

6. Given the following convex quadrilateral such that $\angle CBA$ is a right angle, find the area of the quadrilateral.



7. A silo consists of a cylinder with a hemisphere on top. If the height of the cylinder is half of the diameter of the hemisphere and the total volume of the silo is 600 cubic feet, how many cubic feet will the cylinder part of the silo hold?

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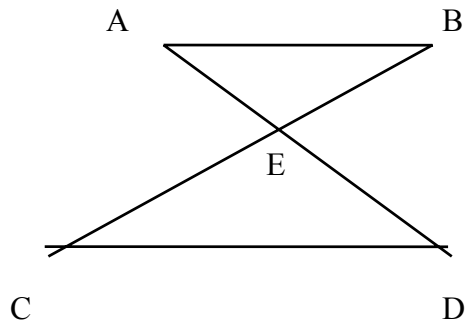
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TEST B

Unless otherwise stated give all exact answers.

SECTION I: ONE POINT EACH

1. What is the maximum number of obtuse angles contained within any parallelogram?
2. 210 feet of fence is used to make a rectangular pen whose length is twice the width. What is the area of the pen?
3. Find the smallest integer x such that $|5 - 2x| \leq 6$.
4. Find the exact area of a triangle whose sides are given by 5 cm, 8 cm, and 12 cm. Express your answer in simplest form.
5. The measure of one of two complementary angles is 27 less than twice the measure of the other. Find the measure in degrees of the smaller of the two angles.
6. Given that line segment \overline{AB} is parallel to line segment \overline{CD} and that angle $\angle AEB$ is 96 degrees while triangle ABE is isosceles. Find the measure of angle $\angle EDC$ in degrees.

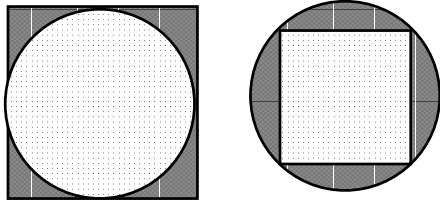


SECTION II: TWO POINTS EACH

1. In a solid cube with an edge of 8 cm, a hole of diameter 3 cm is drilled completely through, perpendicular to the base. Find the total surface area of the resulting figure. Give an exact answer in square centimeters and in simplest form.

2. An aquarium has a length of 15 in. and a width of 11 in. A rock put into the aquarium causes the water level to rise by 2 in. The rock is completely submerged. What is the volume of the rock? Express your answer in cubic inches.

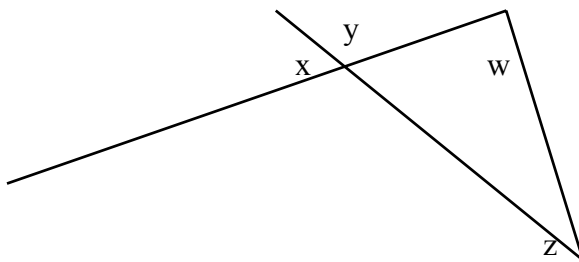
3. A circle of radius 2 meters is inscribed within a square and a square is inscribed within another circle of radius 2 meters (see diagram). Find the exact sum of the areas of the two darkly shaded regions.



4. A lumber mill is cutting lengths of wood with square cross-sections that have 10-in. sides. What is the minimum diameter of the tree trunks that the lumber mill can use?

5. A number n is added to the numerator and the denominator of the fraction $3/5$ and the result is a fraction with value $4/5$. Find the number n .

6. For the angles in the following figure given in degrees, the sum of $\angle w$ and angle $\angle z$ is twice angle $\angle x$. Find the exact values in degrees for both $\angle x$ and $\angle y$



7. The ratio of the areas for two pizzas is 16 to 1, what is the ratio of their corresponding radii.

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Answer Form A

SECTION I: ONE POINT EACH

SECTION II: TWO POINTS EACH

1. _____

1. _____

2. _____

2. _____

3. _____

3. x= _____

4. _____

y= _____

5. _____

4. _____

6. _____

5. a) _____ shares of Dot Com

b) _____ shares of Big Blue

6. _____

7. _____

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Answer Form B

SECTION I: ONE POINT EACH

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____

SECTION II: TWO POINTS EACH

1. _____
2. _____
3. _____
4. _____
5. _____
6. $\angle x$ _____
 $\angle y$ _____
7. _____ to _____