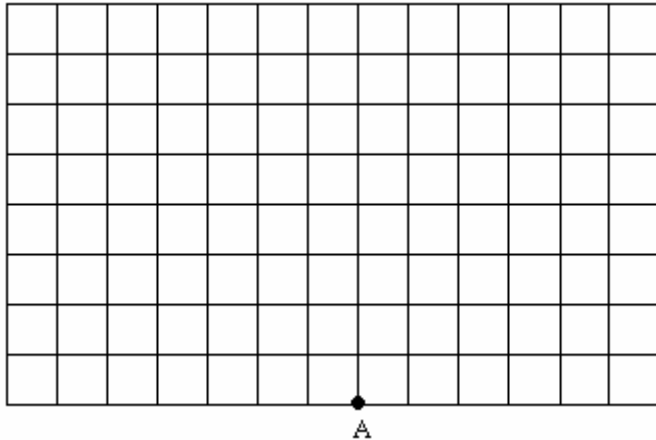


**SOML MEET 3**  
**EVENT 1**  
**Applications of Geometry**

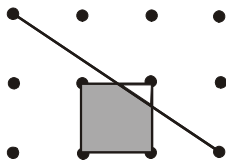
**NAME:** \_\_\_\_\_  
**TEAM:** \_\_\_\_\_  
**SCHOOL:** \_\_\_\_\_

1. [2 Points] A certain point on the ground is marked "A." 3 yards north and 5 yards east of A, there is a second point marked "B." 4 yards north and 4 yards west of B, there is a third point marked "C." 5 yards south and 8 yards west of C, there is a point marked "D." What is the area of quadrilateral ABCD?



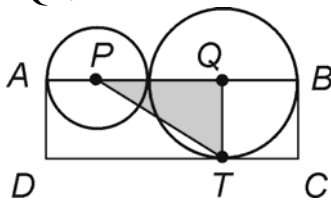
ANS: \_\_\_\_\_ **sq yards**

2. [3 Points] The distance between adjacent points horizontally and vertically is 1 unit. Find the shaded area.



ANS: \_\_\_\_\_ **sq units**

3. [5 Points] The points P and Q are the centers of two circles tangent to each other. Rectangle ABCD is tangent to the bigger circle at the points B and T, and is tangent to the smaller circle at the point A. The area of rectangle ABCD is 15. Find the area of triangle PQT.



ANS: \_\_\_\_\_ **sq units**

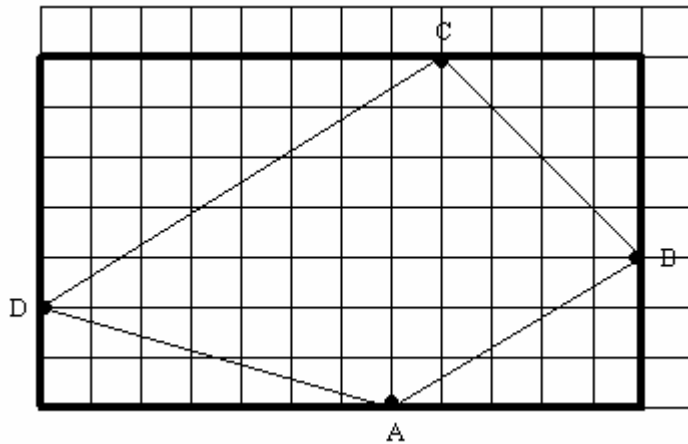
**SOML MEET 3**  
**EVENT 1**  
**Applications of Geometry**

**NAME:** KEY  
**TEAM:** \_\_\_\_\_  
**SCHOOL:** \_\_\_\_\_

1. [2 Points] A certain point on the ground is marked "A." 3 yards north and 5 yards east of A, there is a second point marked "B." 4 yards north and 4 yards west of B, there is a third point marked "C." 5 yards south and 8 yards west of C, there is a point marked "D." What is the area of quadrilateral ABCD?

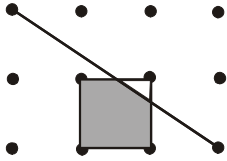
**Solution:**

Put a rectangular frame around the quadrilateral. Its dimensions will be 7 yards by 12 yards, so its area will be  $84 \text{ yd}^2$ . The four triangles that are within the rectangular frame but are outside quadrilateral ABCD have areas of  $7.5 \text{ yds}^2$ ,  $8 \text{ yds}^2$ ,  $20 \text{ yds}^2$ , and  $7 \text{ yds}^2$ , combining to make a total area of  $42.5 \text{ yds}^2$ . Therefore the area of quadrilateral ABCD =  $84 - 42.5 = 41.5 \text{ yds}^2$ .



**ANS:** ABCD = 41.5 sq yds

2. [3 Points] The distance between adjacent points horizontally and vertically is 1 unit. Find the shaded area.



**Solution:**

The diagonal segment has a slope of  $\frac{-2}{3}$ , which can also be expressed as  $\frac{-1}{1\frac{1}{2}}$  or  $\frac{-1\frac{1}{3}}{2}$ .

Thus, from the upper left corner of the diagram, that segment falls 1 unit and runs  $1\frac{1}{2}$  units to

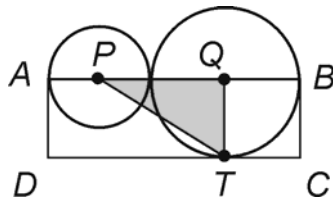
reach the top of the shaded region. Starting again at the upper left, it falls  $1\frac{1}{3}$  units and runs 2

units to reach the right edge of the shaded region. The white triangle has an area of  $(\frac{1}{2})(\frac{1}{2})(\frac{1}{3})$

$= \frac{1}{12}$ , which implies that the shaded region has area  $\frac{11}{12}$ .

ANS: $\frac{11}{12}$ sq units
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3. [5 Points] The points P and Q are the centers of two circles tangent to each other. Rectangle ABCD is tangent to the bigger circle at the points B and T, and is tangent to the smaller circle at the point A. The area of rectangle ABCD is 15. Find the area of triangle PQT.



**Solution:**

Area of  $\Delta PQT = (\frac{1}{2})(PQ)(QT)$ .

Since  $PQ = (\frac{1}{2})(AB)$ , we see that  $\Delta PQT = (\frac{1}{2})(\frac{1}{2})(AB)(QT) = (\frac{1}{4})(AB)(QT)$ .

The area of rectangle ABCD is  $(AB)(QT)$ . Thus, the area of  $\Delta PQT$  is  $\frac{1}{4}$  of 15, or  $\frac{15}{4}$ .

ANS: $\frac{15}{4}$ sq units
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