

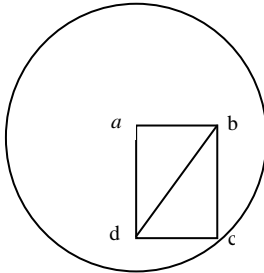
**SOML MEET  
EVENT 3  
CIRCLES**

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

1. [2 Points] What is the radius  $r$  of the circle  $x^2 + y^2 = 6x + 8y$ ?

ANS:  $r =$  \_\_\_\_\_

2. [3 Points] A rectangle,  $abcd$  is drawn in a circle as shown, where  $a$  is the center of the circle and  $c$  is a point on the circle. The circle has diameter 2, and the length of the segment  $ab$  is  $\frac{1}{2}$ . What is the length of the segment  $bd$ ?



ANS: \_\_\_\_\_

3. [5 Points] For which of the following points is it not possible to find a circle through that point and the points  $(4, 7)$  and  $(9, 9)$ ?

ANS: Circle One

$(-12, -1)$

$(-11, 1)$

$(-10, 3)$

**SOML MEET  
EVENT 3  
CIRCLES**

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

1. [2 Points] What is the radius  $r$  of the circle  $x^2 + y^2 = 6x + 8y$ ?

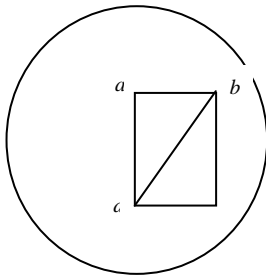
**Solution:** Completing the square(s) yields:

$$(x-3)^2 + (y-4)^2 = 25$$

$$r = 5$$

ANS:  $r = 5$

2. [3 Points] A rectangle,  $abcd$  is drawn in a circle as shown, where  $a$  is the center of the circle and  $c$  is a point on the circle. The circle has diameter 2, and the length of the segment  $ab$  is  $\frac{1}{2}$ . What is the length of the segment  $bd$ ?



**Solution:** Since  $abcd$  is a rectangle, length  $(bd) = \text{length}(ac)$ . But  $ac$ , while not drawn in the picture, is obviously a radius of the circle, and therefore has length 1.

(Note: The fact that length  $(ab) = \frac{1}{2}$  is irrelevant.)

ANS: Length = 1

3. [5 Points] For which of the following points is it not possible to find a circle through that point and the points  $(4, 7)$  and  $(9, 9)$ ?

**Solution:** A circle exists through any three points as long as the three points do not all lie on the same line.

$(4,7)$  and  $(9,9)$  both lie on the line  $y = \frac{2}{5}x + \frac{27}{5}$ . So does  $(-11,1)$ .

(The others do not lie on that line).

ANS: Circle One

$(-12, -1)$

$(-11, 1)$

$(-10, 3)$