# Circle-Step Puzzle

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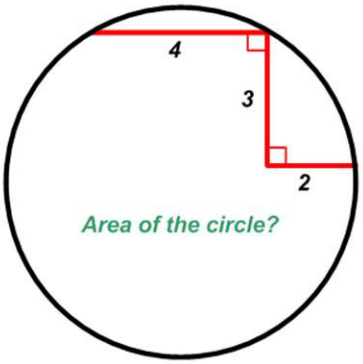
Jim Stevenson




This is a straight-forward problem[1] from Osdinato on Twitter in 2018.

Find the area of the circle in the figure.

## Solution

Locate the circle in cartesian coordinates with the center at (0, 0) as shown in Figure 1. The idea is to solve for the unknown radius r.

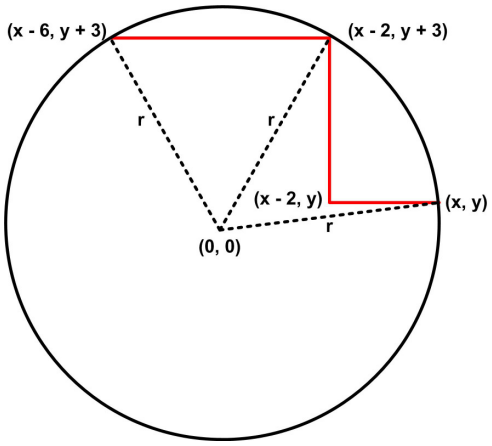



**Figure 1**

We get three equations involving the radius:

$$x^2 + y^2 = r^2$$

$$(x - 2)^2 + (y + 3)^2 = r^2$$

$$(x - 6)^2 + (y + 3)^2 = r^2$$

Expand the second equation :

$$x^2 - 4x + 4 + y^2 + 6y + 9 = r^2$$

and subtract the first equation $x^2 + y^2 = r^2$ to get

$$\mathbf{4x - 6y = 13}$$

Expand the third equation:

$$x^2 - 12x + 36 + y^2 + 6y + 9 = r^2$$

and subtract the first equation $x^2 + y^2 = r^2$ to get

$$12x - 6y = 45$$

or

$$\mathbf{4x - 2y = 15}$$

Subtracting the first bold equation from the second yields

$$4y = 2 \Rightarrow y = ½$$

and then

$$4x = 16 \Rightarrow x = 4$$

so that the area is

$$\pi r^2 = \pi (4^2 + (1/2)^2) = \pi\ 65/4$$



[1] Osdinato, Problem 15, (https://twitter.com/osdinato/status/1025125661759995906) [Link broken]