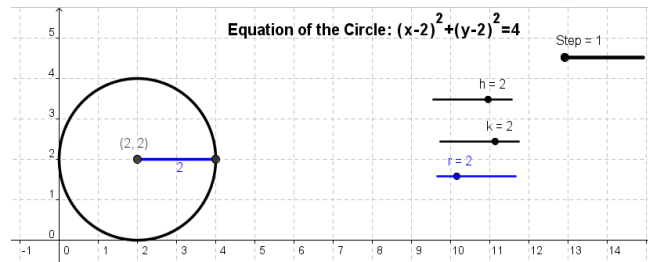


## Student Activity on Circles with Centre (h,k)

Use in connection with the interactive file "Circles with Centre (h,k)" on the Student's CD.

To explore the properties of circles with centre (h,k)



The slider called "Step" is used to change the information on the screen.

To start set the slider to "Step = 1"

1. Adjust the sliders and watch the size, equation and location of the circle change.
2. As h increases i.e. moves from -5 to 5 what happens the circle? \_\_\_\_\_
3. As h decreases i.e. moves from 5 to -5 what happens the circle? \_\_\_\_\_
4. As k increases i.e. moves from -5 to 5 what happens the circle? \_\_\_\_\_
5. As k decreases i.e. moves from 5 to -5 what happens the circle? \_\_\_\_\_
6. Describe how you would work out the centre of the circle  $(x-3)^2 + (y+4)^2 = 25$ . \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_
7. Adjust h or k so that the centre of the circle is on the x-axis. What do you notice about the equation? \_\_\_\_\_

8. Adjust  $h$  or  $k$  so that the centre of the circle is on the  $y$ -axis. What do you notice about the equation? \_\_\_\_\_

9. In what circumstances would a circle have an equation of  $x^2+(y-4)^2=36$ ? \_\_\_\_\_  
\_\_\_\_\_

10. In what circumstances would a circle have an equation of  $x^2+y^2=36$ ? \_\_\_\_\_  
\_\_\_\_\_

11. Describe how to find the equation of the circle with centre  $(2, 4)$  and radius  $3$ . \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

12. As its radius increases what happens to a circle? \_\_\_\_\_

13. Make  $h = 2$ ,  $k = 2$  and  $r = 3$ . Write down the equation you see. \_\_\_\_\_

14. Make  $h = 2$ ,  $k = 2$  and  $r = 4$ . Write down the equation you see. \_\_\_\_\_

15. Make  $h = 2$ ,  $k = 2$  and  $r = 5$ . Write down the equation you see. \_\_\_\_\_

16. Looking at the last three answers can you write down what happens the right hand side of the equation as the radius increases? \_\_\_\_\_  
\_\_\_\_\_

17. Can you describe how we get the number on the right hand side of the equation? \_\_\_\_\_

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18. If you were given an equation like this one:  $(x-2)^2+(y+3)^2=25$  what shape would you expect it to be? \_\_\_\_\_

19. If you were given an equation like this one:  $x^2+y^2=20$  what shape would you expect it to be? \_\_\_\_\_

If you have completed Student Activity on Circles with Centre (0,0) 3 then you should try the following questions:

20. Move the “Step” slider to 2. You are given the equation  $(x-2)^2+(y+3)^2=16$ . The centre of this circle is (2, -3). The radius of this circle is 4. This is a whole number so you could count 4 units in any direction to get different points on the circle. Move the blue dot to a point on the circle.

21. Move the “Step” slider to 3. You are given the equation  $(x-2)^2+(y+3)^2=29$ . The centre of this circle is (2, -3) and the radius is  $\sqrt{29}$ . This isn't a whole number so it's harder to find points (with whole number coordinates) on the circle. Can you think of two numbers that when squared and are then added together add up to 29 i.e.  $( )^2+( )^2= 29$ .

22. The numbers you put in the brackets in the last question are the number of units you could take from the centre across and up to get a point on the circle. If you have five units to the right of the centre and two units up you should have a point that is  $\sqrt{29}$  from the centre.
23. If two people moved from the same start point and one moved five steps to the right and two steps forward and the other moved two steps to the right and five steps up what can you say about their distances from the start point? \_\_\_\_\_
24. Use this answer to move the blue dot to another point on the circle.
25. Move the blue dot to another (different) point on the circle?

**You could now try “Drawing Circles Quiz 3” and “Drawing Circles Quiz 4” which are also on this CD/Website**