Open browser and go to www.desmos.com/calculator or use the Desmos app.

1. Create a new graph. Click on the  button in top left corner.

2. Click on  to enter an expression.

3. To enter another expression and plot it on the same graph, you just click in the next entry row, and enter your next expression.

4. You can change the x and y axes scales using the  menu at top right corner.

5. Note: you can also "hide" a graph by clicking on the  icon beside each expression.

Part 1

1. Enter the following equations on Desmos

   a. $x^2 + y^2 = 1$

   b. $x^2 + y^2 = 4$

   c. $x^2 + y^2 = 9$

2. What mathematical shape does each equation produce?

3. What effect does the constant have on the shape?

4. What is significant about the origin in each graph?

Part 2

Enter the expression $(x-a)^2+y^2=4$.

Click on the add slider: a button when it appears.

This allows you to vary the values of a , using the slider. Try varying the values of a for both positive and negative values of a and note what happens to the graph.

1. What was the effect of adding or subtracting a constant from the x term?

2. What effect would you expect when adding or subtracting a constant from the y term?

Enter the expression $x^2+(y-b)^2=4$

Click on the add slider: b **button when it appears.**

Try varying the values of **b**, for both positive and negative values of **b**, and note what happens to the graph.

3. What was the effect of adding or subtracting a constant from the y term? Was your conjecture correct?

4. Now, enter the equation $(x-a)^2+(y-b)^2=r^2$ and by using sliders plot the graphs below. State the centre and radius of each

a.	$(x-1)^2+(y-1)^2=4$	centre	radius
b.	$(x+2)^2+(y+3)^2=9$	centre	radius
c.	$(x+1)^2+(y-4)^2=1$	centre	radius
d.	$(x-4)^2+(y-2)^2=25$	centre	radius

Summary

The equation $(x-a)^2+(y-b)^2=r^2$ represents a circle centre (a,b) and radius r .

5. State the equations of the circles with:

(a) centre the origin and radius 2

(b) centre the origin and radius 6

(c) centre (2,3) and radius 5

(d) centre (2,0) and radius 7

(e) centre (-1,2) and radius 3

(f) centre (-2,-2) and radius 12

(g) centre (-5,10) and radius 15

(h) centre (12,-7) and radius 25

You should check your equations in Desmos and confirm your work

6. State the coordinates of the centre and the radius of each of these circles:

a. $x^2 + y^2 = 36$ centre radius

b. $x^2 + (y-1)^2 = 4$ centre radius

c. $(x+4)^2 + y^2 = 25$ centre radius

d. $(x-3)^2 + (y-2)^2 = 81$ centre radius

e. $(x+5)^2 + (y-7)^2 = 100$ centre radius

f. $(x+3)^2 + (y+2)^2 = 12$ centre radius

You should check your equations in Desmos and confirm your work