Question 1 (5 Marks)

Solve algebraically the simultaneous equations

$$x^2 + y^2 = 25$$
$$y - 3x = 13$$

Question 2 (4 Marks)

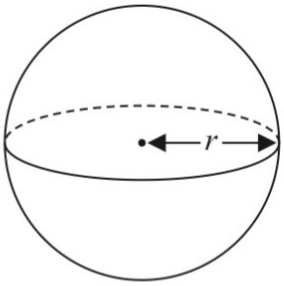
The centre of a circle is the point with coordinates $(-1, 3)$

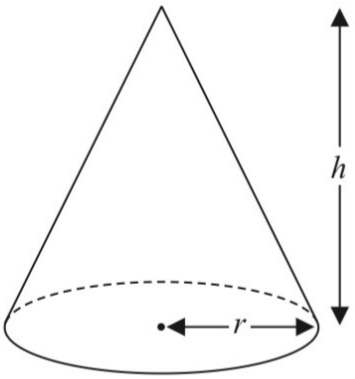
The point A with coordinates $(6, 8)$ lies on the circle.

Find an equation of the tangent to the circle at A.
Give your answer in the form $ax + by + c = 0$ where a, b and c are integers.

Question 3 (6 Marks)

Here is a solid sphere and a solid cone.





Volume of sphere $= \frac{4}{3}\pi r^3$

Volume of cone $= \frac{1}{3}\pi r^2 h$

All measurements are in cm.

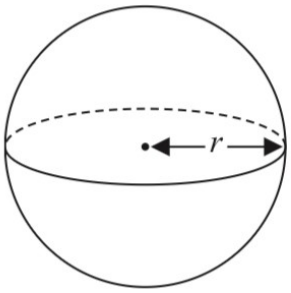
The volume of the sphere is equal to the volume of the cone.

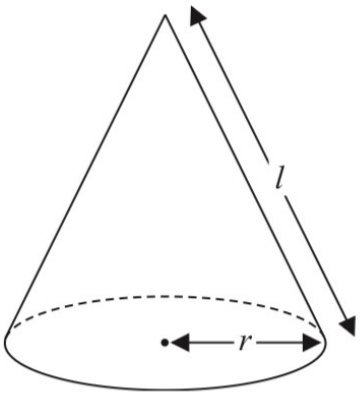
(a) Find $r : h$
Give your answer in its simplest form.

.....

(2)

Here is a different solid sphere and a different solid cone.





Surface area of sphere = $4\pi r^2$

Curved area of cone = πrl

All measurements are in cm.

The surface area of the sphere is equal to the **total** surface area of the cone.

(b) Find $r : h$

Give your answer in the form $1 : \sqrt{n}$ where n is an integer.

.....

(4)

(Total 15 Marks)