Circles – Questions

Q1) Find the equation of the circle with the following center and radius. Write your equation in the form $(x-a)^2+(y-b)^2=r^2$.

a) Centre $(3,5)$, Radius 5

b) Centre $(-8,-3)$, Radius $\sqrt{7}$

Q2) State the center and radius of each of these circles.

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

b) $(x-3)^2+y^2=49$

c) $x^2+y^2+2x-8y+3=0$

d) $x^2+y^2-6x-10y+17=0$

Q3) Which of these equations represent circles?

a) $x^2+y^2+4x+4y+3=0$

b) $x^2+y^2-2x+2y+6=0$

Q4) a) Find the equation of the tangent to the circle $x^2+y^2-4x-10y-24=0$ at the point $(9,3)$.

b) Find the equation of the tangent to the circle $x^2+y^2+6x-14y-27=0$ at the point $(6,9)$.

Q5) a) Is the line with equation $3y-5x=11$ a chord or tangent to the circle $x^2+y^2-14x-8y+31=0$ . . . or does it not touch it?

b) Determine whether or not the line with equation $5y-8x=22$ is a chord, tangent or does not intersect the circle with equation $x^2+y^2-10x+14y-15=0$.

Q6) Determine how many points of intersection, if any, there are between these pairs of circles.

a) $x^2 + y^2 + 4y - 32 = 0$ and $x^2 + y^2 - 16x - 12y + 75 = 0$

b) $x^2 + y^2 + 8x + 4y - 61 = 0$ and $x^2 + y^2 - 16x - 6y - 57 = 0$

Q7) A circle C_1 has equation $x^2 + y^2 - 18x - 22y - 23 = 0$ and a second circle C_2 has equation $x^2 + y^2 + 14x + 2y + p = 0$. If the circles touch at one point only, determine the value of p.

Q8) A circle has equation $(x - 2)^2 + (y - 1)^2 = 25$. The line $y = 3x$ intersects the circle. Determine the coordinates of the point(s) of intersection.

Circles – Solutions

Q1) a) $(x-3)^2+(y-5)^2=25$

b) $(x+8)^2+(y+3)^2=7$

Q2) a) $(x-3)^2+(y+4)^2=25$

Centre $=(3,-4)$, Radius $=5$

b) $(x-3)^2+y^2=49$

Centre $=(3,0)$, Radius $=7$

c) $x^2+y^2+2x-8y+3=0$

Centre $=(-1,4)$, Radius $=\sqrt{14}$

d) $x^2+y^2-6x-10y+17=0$

Centre $=(3,5)$, Radius $=\sqrt{17}$

Q3) a) Radius $=5$. Since the radius is positive the equation represents a circle.

b) Radius $=\sqrt{-4}$. Since we cannot take the square root of a negative the equation does not represent a circle.

Q4) a) $2y=7x-15$

b) $2y=-9x+72$

Q5) a) The line is a tangent to the circle.

b) The line does not meet the circle.

Q6) a) Since the distance between the centre's is greater than the sum of the radii, the circles do not intersect.

b) Since the distance between the centre's is less than the sum of the radii, the circles intersect at two points.

Q7) $p=25$

Q8) $(-1,-3)$ and $(2,6)$