

A circle has equation $x^2 + y^2 + 8x + 6y - 75 = 0$.

What is the radius of this circle?

- A 5
- B 10
- C $\sqrt{75}$
- D $\sqrt{175}$

The line with equation $y = 2x$ intersects the circle with equation $x^2 + y^2 = 5$ at the points J and K.

What are the x -coordinates of J and K?

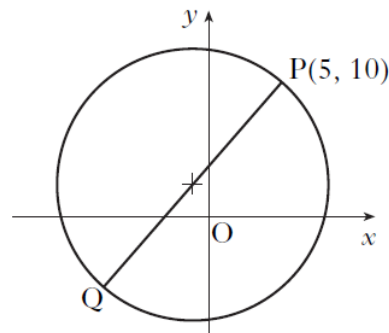
- A $x_J = 1, x_K = -1$
- B $x_J = 2, x_K = -2$
- C $x_J = 1, x_K = -2$
- D $x_J = -1, x_K = 2$

(a) Show that the point $P(5, 10)$ lies on circle C_1 with equation $(x + 1)^2 + (y - 2)^2 = 100$.

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(b) PQ is a diameter of this circle as shown in the diagram. Find the equation of the tangent at Q .

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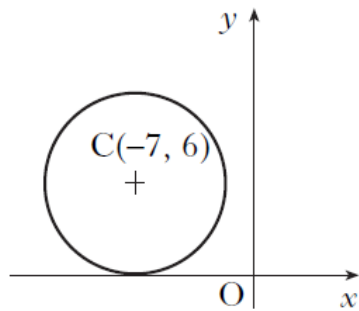
(c) Two circles, C_2 and C_3 , touch circle C_1 at Q .

The radius of each of these circles is twice the radius of circle C_1 .

Find the equations of circles C_2 and C_3 .

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The x -axis is a tangent to a circle with centre $(-7, 6)$ as shown in the diagram.

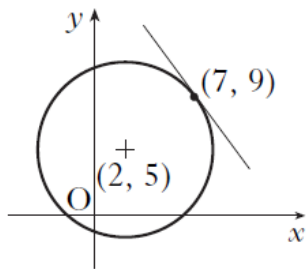


What is the equation of the circle?

- A $(x + 7)^2 + (y - 6)^2 = 1$
- B $(x + 7)^2 + (y - 6)^2 = 49$
- C $(x - 7)^2 + (y + 6)^2 = 36$
- D $(x + 7)^2 + (y - 6)^2 = 36$

The diagram shows a circle, centre $(2, 5)$ and a tangent drawn at the point $(7, 9)$.

What is the equation of this tangent?



- A $y - 9 = -\frac{5}{4}(x - 7)$
- B $y + 9 = -\frac{4}{5}(x + 7)$
- C $y - 7 = \frac{4}{5}(x - 9)$
- D $y + 9 = \frac{5}{4}(x + 7)$

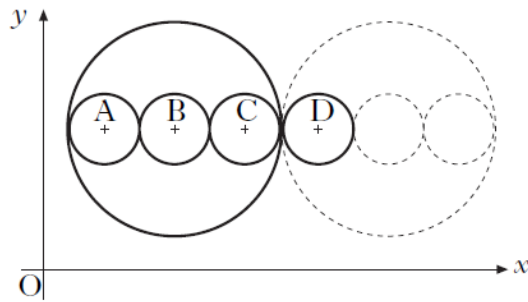
- (a) Write down the centre and calculate the radius of the circle with equation $x^2 + y^2 + 8x + 4y - 38 = 0$. 2
- (b) A second circle has equation $(x - 4)^2 + (y - 6)^2 = 26$.
Find the distance between the centres of these two circles and hence show that the circles intersect. 4
- (c) The line with equation $y = 4 - x$ is a common chord passing through the points of intersection of the two circles.
Find the coordinates of the points of intersection of the two circles. 5

The large circle has equation $x^2 + y^2 - 14x - 16y + 77 = 0$.

Three congruent circles with centres A, B and C are drawn inside the large circle with the centres lying on a line parallel to the x -axis.

This pattern is continued, as shown in the diagram.

Find the equation of the circle with centre D. 5



- Show that the line with equation $y = 6 - 2x$ is a tangent to the circle with equation $x^2 + y^2 + 6x - 4y - 7 = 0$ and find the coordinates of the point of contact of the tangent and the circle. 6

A circle centre C is situated so that it touches the parabola with equation $y = \frac{1}{2}x^2 - 8x + 34$ at P and Q.

- (a) The gradient of the tangent to the parabola at Q is 4. Find the coordinates of Q. 5
- (b) Find the coordinates of P. 2
- (c) Find the coordinates of C, the centre of the circle. 2

