
CORE MATHEMATICS 2 – COORDINATE GEOMETRY
EXTRA PRACTICE

1. Find an equation of the circle

- a) with centre $(1, -2)$ which passes through the point $(4, 2)$.
 - b) with centre $(-5, 7)$ which passes through the point $(0, 5)$.
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2. The points $P(0, 1)$, $Q(3, 10)$ and $R(6, 9)$ all lie on circle C .

- a) Show that \hat{PQR} is a right-angle.
 - b) Hence, show that C has the equation $x^2 + y^2 - 6x - 10y + 9 = 0$.
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3. Find in each case whether the given point lies inside, outside or on the given circle.

- a) $(0, 9)$ $x^2 + y^2 = 64$
 - b) $(4, 7)$ $x^2 + y^2 - 2x - 6y - 26 = 0$
 - c) $(7, -3)$ $x^2 + y^2 + 10x - 4y = 140$
 - d) $(-4, 1)$ $x^2 + y^2 + 2x + 8y - 13 = 0$
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4. The circle C , with centre A , has equation

$$x^2 + y^2 - 6x + 4y - 12 = 0.$$

- a) Find the coordinates of A .
- b) Show that the radius of C is 5.

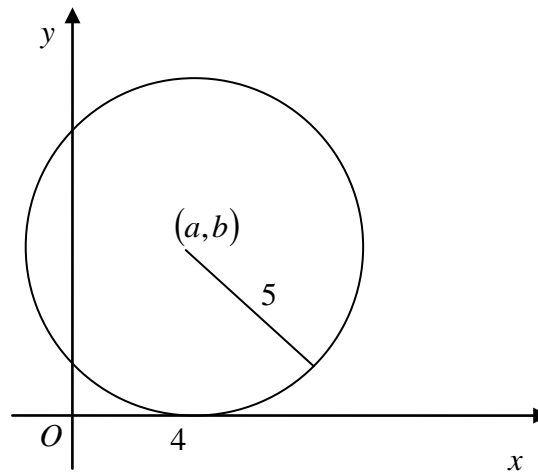
The points P , Q and R lie on C . The length of PQ is 10 and the length of PR is 3.

- c) Find the length of QR , giving your answer to 1 decimal place.
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5. A circle C has equation $x^2 + y^2 - 10x + 6y - 15 = 0$.

- a) Find the coordinates of the centre of C .
 - b) Find the radius of C .
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6. The circle C with centre (a,b) and radius 5, touches the x -axis at $(4,0)$, as shown in the figure below.



- a) Write down the value of a and the value of b .
 b) Find a Cartesian equation of C .

A tangent to the circle, drawn from the point $P(8,17)$, touches the circle at T .

- c) Find, to 3 significant figures, the length of PT .
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7. A circle C has centre $(3,4)$ and radius $3\sqrt{2}$. A straight line has equation $y = x + 3$.

- a) Write down an equation of the circle C .
 b) Calculate the exact coordinates of the two points, where the line intersects C , giving your answers as surds.
 c) Find the distance between these two points.
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8. The line with equation $y = 1 - x$ intersects the circle with equation $x^2 + y^2 + 6x + 2y = 27$ at the points A and B .

Find the length of the chord AB , giving your answer in the form $k\sqrt{2}$.

9. Show that the line with equation $y = 2x + 1$ is a tangent to the circle with equation $x^2 + y^2 - 8x - 8y + 27 = 0$ and find the coordinates of the point where they touch.
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10. The line with equation $y = mx$ is a tangent to the circle with equation $x^2 + y^2 - 8x - 16y + 72 = 0$.

Find the two possible values of m .

11. The line AB is a diameter of circle C.

Given that A has coordinates $(-5,6)$ and B has coordinates $(3,8)$, find

- a) The coordinates of the centre of C,
 - b) A Cartesian equation for C,
 - c) An equation of the tangent to C at A.
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12. The points $P(-4,9)$ and $Q(-2,-5)$ are such that PQ is a diameter of circle C.

- a) Find the coordinates of the centre of C.
 - b) Find an equation for C.
 - c) Show that the point $R(2,7)$ lies on C.
 - d) Hence, state the size of \hat{PRQ} , giving a reason for your answer.
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13. The points $P(-10,2)$, $Q(8,14)$ and $R(-2,-10)$ all lie on circle C.

- a) Show that PR is perpendicular to PQ.
 - b) Hence, show that C has the equation $x^2 + y^2 - 6x - 4y - 156 = 0$.
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