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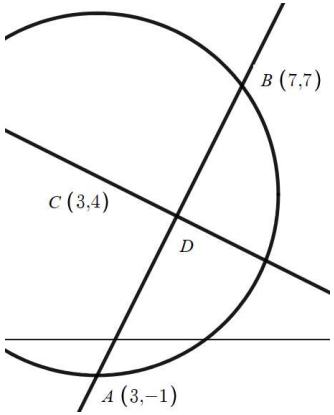
A LEVEL MATHS

(33) Circles (Tangents and Chords)

WORKING AT D/E

(1) Find the equation of the tangent to the circle with equation $x^2 + y^2 = 100$ at the point $(6,8)$. Give your answer in the form $y = mx + c$ where m and c are simplified fractions.

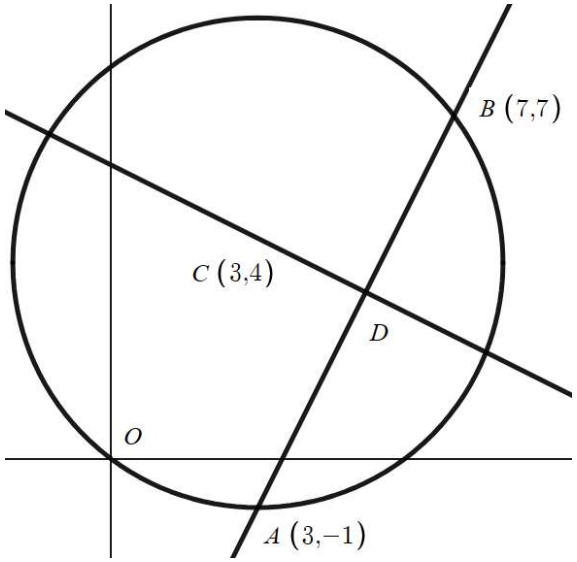
(2) The diagram below shows part of a circle. The line ADB is a chord to the circle and C is the centre of the circle. Given that the line segment CD is part of the radius, find the coordinate of D.



(3) A circle has centre C. A tangent is drawn to the circle at the point P. The gradient of the tangent at P is m. Write down the gradient of the radius CP giving your answer in terms of m.

WORKING AT B/C

(1) The diagram shows a circle centre C and chord ADB. The line CD lies on the radius of the circle.



(a) Find the equation of the circle.
(b) Show that the coordinates of D are $(5,3)$
(c) Hence, find the exact length of the line CD.

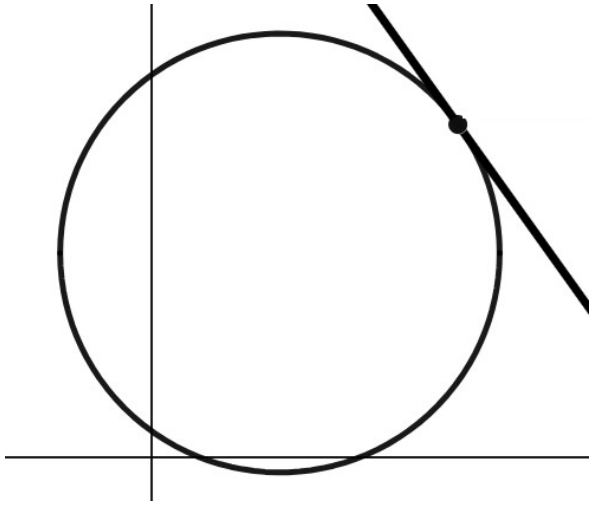
(2) Find the equation of the tangent to the circle with equation $(x-2)^2 + (y+7)^2 = 20$ at the point $(4,-3)$. Give your answer in the form $ax + by = c$.

(3) A circle has equation $x^2 + y^2 = 16$. Find the equation of any vertical or horizontal tangents to the circle.

WORKING AT A*/A

(1) Circle C has points A $(1,15)$, B $(6,14)$ and C $(-4,-10)$. By considering 2 different chords, prove that the centre of the circle C has coordinates $(1,2)$

(2) The diagram below shows a circle with equation $(x-a)^2 + (y-8)^2 = r^2$. The tangent to the circle at the point $(12,13)$ has gradient -1.4



Find the value of the constant a.

(3) A circle has centre $(0,0)$ and radius $5\sqrt{5}$. The tangents at the points A and B have a gradient of 2. Show that the coordinates of A and B have integer values.