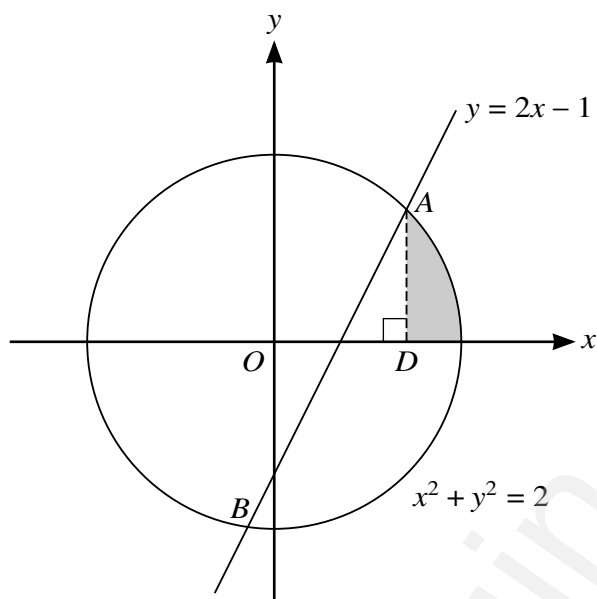




The diagram shows the circle $x^2 + y^2 = 2$ and the straight line $y = 2x - 1$ intersecting at the points A and B . The point D on the x -axis is such that AD is perpendicular to the x -axis.

- [4]

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1 Points A and B have coordinates $(5, 2)$ and $(10, -1)$ respectively.

(a) Find the equation of the perpendicular bisector of AB . [3]

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(b) Find the equation of the circle with centre A which passes through B . [3]

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- 5 A circle has equation $(x - 1)^2 + (y + 4)^2 = 40$. A line with equation $y = x - 9$ intersects the circle at points A and B .

(a) Find the coordinates of the two points of intersection. [4]

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(b) Find an equation of the circle with diameter AB . [3]

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6 Circles C_1 and C_2 have equations

$$x^2 + y^2 + 6x - 10y + 18 = 0 \text{ and } (x - 9)^2 + (y + 4)^2 - 64 = 0$$

respectively.

(a) Find the distance between the centres of the circles.

[4]

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P and Q are points on C_1 and C_2 respectively. The distance between P and Q is denoted by d .

(b) Find the greatest and least possible values of d .

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- 7 A circle with centre $(5, 2)$ passes through the point $(7, 5)$.

(a) Find an equation of the circle. [2]

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The line $y = 5x - 10$ intersects the circle at A and B .

(b) Find the exact length of the chord AB . [7]

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[illegible]

- (a)** Find the equation of the circle, C , for which AB is a diameter.

[4]

- (b) Find the equation of the tangent, T , to circle C at the point B . [4]

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- (c) Find the equation of the circle which is the reflection of circle C in the line T . [3]

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- 8** The equation of a circle is $x^2 + y^2 + px + 2y + q = 0$, where p and q are constants.
- (a)** Express the equation in the form $(x-a)^2 + (y-b)^2 = r^2$, where a is to be given in terms of p and r^2 is to be given in terms of p and q . [2]

[illegible]

The line with equation $x + 2y = 10$ is the tangent to the circle at the point $A(4, 3)$.

- (b) (i)** Find the equation of the normal to the circle at the point A . [3]

[illegible]



[5]

[illegible]

- Find the coordinates of P .

[8]

This image shows a full page of primary-ruled paper. It features multiple sets of horizontal dotted lines spaced evenly down the page. A large, light gray watermark with the text "pastpaperpenquinn.com" is oriented diagonally from the bottom left towards the top right, covering most of the page area. The background is white, and there are no other markings or text present.

10 Points $A(-2, 3)$, $B(3, 0)$ and $C(6, 5)$ lie on the circumference of a circle with centre D .

- (a)** Show that angle $ABC = 90^\circ$. [2]

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- (b)** Hence state the coordinates of D . [1]

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- (c)** Find an equation of the circle. [2]

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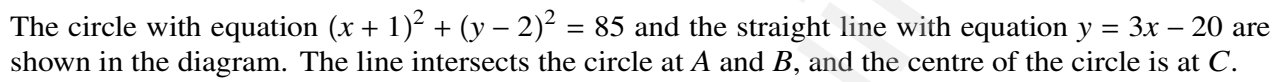
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[5]

This image shows a full page of primary-ruled paper. It features multiple horizontal dotted lines spaced evenly down the page. A large, light gray watermark with the text "pastpaperpenguin.com" is oriented diagonally from the bottom left towards the top right, covering most of the page area. The background is white, and there are no other markings or text present.



- [illegible]

- (a) Given that $p < 10$, find the value of p . [4]

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[illegible]

A circle passes through the points A , B and C .

- (b) Find the equation of the circle. [3]

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- (c) Find the equation of the tangent to the circle at C , giving the answer in the form $dx + ey + f = 0$, where d , e and f are integers. [3]

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10 The equation of a circle is $x^2 + y^2 - 4x + 6y - 77 = 0$.

- (a) Find the x -coordinates of the points A and B where the circle intersects the x -axis. [2]

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- (b) Find the point of intersection of the tangents to the circle at A and B . [6]

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- 5** Points $A(7, 12)$ and B lie on a circle with centre $(-2, 5)$. The line AB has equation $y = -2x + 26$.

Find the coordinates of B .

[6]

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- (a)** Find the coordinates of A and B in surd form and hence find the exact length of the chord AB .

[7]

[5]

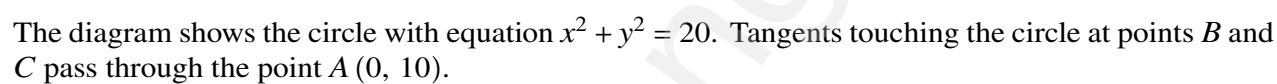
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- (a)** Find an equation of the circle.

[5]

- (b) Find an equation of the tangent to the circle at B .

[2]



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- This image shows a blank sheet of white paper with horizontal ruling lines. The lines are evenly spaced and extend across the width of the page. A faint, diagonal watermark reading "Pastpaper" is visible across the center.

- (b) Find the coordinates of B and C .

[3]

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The point D is where the circle crosses the positive x -axis.

- (c) Find angle BDC in degrees.

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