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## PURE MATH

## ALGEBRA AND FUNCTION

| Level \& Board | EDEXCEL (A-LEVEL) |
| :--- | :--- |
| TOPIC: | CIRCLES |
|  |  |
| PAPER TYPE: | QUESTION PAPER - 5 |
| TOTAL QUESTIONS | 8 |
| TOTAL MARKS | 64 | individual/ company/organization involved in copyright abuse.

## Questions

Q1.
A circle C with radius r

- lies only in the 1st quadrant
- touches the $x$-axis and touches the $y$-axis

The line l has equation $2 \mathrm{x}+\mathrm{y}=12$
(a) Show that the $x$ coordinates of the points where $l$ intersects with $C$ satisfy the equation $5 x^{2}+(2 r-48) x+\left(r^{2}-24 r+144\right)=0$.
(3)

Given also that l is a tangent to C ,
(b) Given that l is a tangent to C , find the two possible values of r. Please provide your answers as fully simplified surds.

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(Total for question = 7 marks)

Q3.
A circle, denoted by C, with a radius r lies in the first quadrant, touches the $x$ axis, and is tangent to the line L with the equation $\mathrm{y}=2 \mathrm{x}+8$.
(a) Show that the $x$-coordinates of the points where line $L$ intersects with circle C satisfy the equation $\left(x^{\wedge} 2-16 x+64-r^{\wedge} 2\right)=0$.
(3)
(b) Given that line L is a tangent to circle C , determine the possible values of r.

A circle, denoted by C, with a radius $r$ lies in the first quadrant, touches the $x-$ axis, and is tangent to the line L with the equation $\mathrm{y}=2 \mathrm{x}+8$.
(a) Show that the x -coordinates of the points where line L intersects with circle $C$ satisfy the equation $\left(x^{\wedge} 2-16 x+64-r^{\wedge} 2\right)=0$.
(3)
(b) Given that line L is a tangent to circle C , determine the possible values of r.

## Q5.

A circle (C) with radius (r) lies in the third quadrant, touches the x -axis and is tangent to the line ( l ) with the equation $2 \mathrm{x}+5 \mathrm{y}=15$.
a) Prove that the x -coordinates of the points where (l) intersects with (C) satisfy the equation $5 x^{\wedge} 2+20 x+25-r^{\wedge} 2=0$.
b) Given that (l) is a tangent to (C), determine the possible values of (r).

## Q6.

A circle with a radius is situated in the fourth quadrant, touches the $y$-axis, and is tangent to the line with the equation $3 x-4 y=12$.
(a) Prove that the y coordinates of the points where line intersects with circle satisfy the equation $16 y^{\wedge} 2-96 y+144-9 r^{\wedge} 2=0$.
(b) Assuming that line is a tangent to circle , determine the possible values of radius.
(4)
(Total for question = 7 marks)

Q7.
A circle with radius 'r' that is located in the 1st quadrant, touching the $x$-axis, and is tangent to the line ' l ' with the equation $\mathrm{y}=\mathrm{x}+5$ '.
(a) Show that the $x$-coordinates of the points where 'l' intersects with the circle satisfy the equation ' $x^{\wedge} 2-10 x+25-r^{\wedge} 2=0$ '.
(4)
(b) Given that ' l ' is a tangent to the circle, we need to find the possible values of 'r'.
(3)
(Total for question = 7 marks)

Q8.
A circle " C " with radius " r " that is located in the second quadrant, touchesthe $y$-axis, and is tangent to the line " 1 " with the equation $2 x+3 y=6$.
(a) Show that the y-coordinates of the points where "l" intersects with "C" satisfy the equation $9 y^{\wedge} 2+36 y+36-4 r^{\wedge} 2=0$.
(b) Given that "l" is a tangent to "C", find the possible values of "r". Please provide your answers.
(Total for question = 7 marks)


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