Circle Graphs and Tangents

Please write clearly in block capitals

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Materials

For this paper you must have:
• mathematical instruments

You can use a calculator.

Instructions

• Use black ink or black ball-point pen. Draw diagrams in pencil.
• Fill in the boxes at the top of this page.
• Answer all questions.
• You must answer the questions in the spaces provided. Do not write outside the box around each page or on blank pages.
• Do all rough work in this book. Cross through any work you do not want to be marked.

Information

• The marks for questions are shown in brackets.
• You may ask for graph paper, tracing paper and more answer paper. These must be tagged securely to this answer book.

Advice

• In all calculations, show clearly how you work out your answer.
1(a) Which of the following equations represents a circle with a centre at (0,0) and a radius of 8? Circle your answer. [1 mark]

\[ x^2 + y^2 = 16 \]

\[ (x + 8)^2 + y^2 = 0 \]

\[ x^2 + y^2 = 64 \]

\[ x^2 + (y + 8)^2 = 0 \]

1(b) Which of the following equations represent a line that passes through the point (0,7) and is tangent to a circle at point (3,4)? Circle your answer. [1 mark]

\[ y = \frac{3}{4}x + 7 \]

\[ y = -x + 7 \]

\[ y = 7x + \frac{3}{4} \]

\[ y = 7x - 1 \]

1(c) Describe the circle given the following equation: \( x^2 + y^2 = 25 \) Circle your answer. [2 marks]

Centre, (0,0)  
Radius, 50  
Centre, (0,0)  
Radius, 10

Centre, (0,0)  
Radius, 12.5  
Centre, (0,0)  
Radius, 5
Consider the following circle with centre at \((0, 0)\) which crosses the point, \((-4, 0)\).

2(a) What is the diameter of the circle? [1 mark]

Answer

2(b) What is the equation of this circle? [3 marks]

Answer

Turn over for next question
3(a) Determine the radius for the following circle: $x^2 + y^2 = 32$. 
Give your answer in surd form. 

(Last 8) 
[2 marks]

3(b) If the centre of the circle was moved 3 places to the left and 5 places up, what would the origin be? 

[2 marks]

Answer ________________________________

Answer ________________________________

Answer ________________________________

Answer ________________________________

Answer ________________________________

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Turn over
Consider the following circle, with centre (0,0) (Level 9)
Point P has the coordinates (−3, −5)

Work out the equation of the tangent, \(AB\), to the circle at point \(P\).
Give your answer in the form \(ay = bx + d\) where \(a, b\) and \(d\) are integers.

[3 marks]

Answer: ____________________________
Consider the following circle, with centre \((0,0)\), and a radius of 5

Point \(P\) has the coordinates \((-3,4)\)

Work out the equation of the tangent, \(AB\), to the circle at point \(P\).

Give your answer in the form \(ay = bx + d\), where \(a\), \(b\) and \(d\) are integers.

[3 marks]

Answer: 

\[

\text{Answer: } y = \ldots
\]
Consider the following circle, with centre $(0,0)$, and a radius of 12
Point $Q$ has the coordinates $(5,13)$

Work out the equation of the tangent, $AB$, to the circle at point $Q$.
Give your answer in the form $ay = bx + d$, where $a, b$ and $d$ are integers.

[3 marks]

Answer

_________________________
_________________________
_________________________
_________________________
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Turn over for next question
Consider the following circle, with centre $(-1,2)$, and a radius of 5

Point $P$ has the coordinates $(2,-2)$

Work out the equation of the tangent, $AB$, to the circle at point $P$.

Give your answer in the form $ay = bx + d$, where $a, b$ and $d$ are integers.

[3 marks]
Find the equation of a circle, with centre (0,0), where the tangent meets the circle at \( \left( \frac{12}{5}, -\frac{4}{5} \right) \). 

(Level 9) 

[3 marks] 

Answer