HIGHER ONLY

HIGHER TIER

Name ..... **Class** .....

A16: Circles

Solve problems with circles centred at the origin and their tangents

20 marks · 25 minutes · Non-calculator

---

1) The line $y = x + 1$ meets the circle $x^2 + y^2 = 25$ at A and B. Find the exact length of AB.

.....

[Question 1: 4 marks]

---

2) The tangent to $x^2 + y^2 = 20$ at $(2, 4)$ meets the x-axis at T. Find T.

.....

[Question 2: 4 marks]

---

3) A square has all four vertices on the circle $x^2 + y^2 = 18$ and its sides parallel to the axes. Find its area.

.....

[Question 3: 3 marks]

---

4) $(5, k)$ lies on $x^2 + y^2 = 50$. Find the possible values of k.

.....

[Question 4: 2 marks]

---

5) The circle $x^2 + y^2 = r^2$ passes through $(6, 8)$. Find its exact circumference.

.....

[Question 5: 2 marks]

---

6) Is the line $y = 10$ a tangent to $x^2 + y^2 = 100$? Explain.

.....

[Question 6: 2 marks]

---

7) Find the exact area between the circles $x^2 + y^2 = 25$ and $x^2 + y^2 = 9$

.....

[Question 7: 3 marks]

End of paper – 20 marks in total

Answers and brief mark scheme

Q	Answer	Method / notes
1	$7\sqrt{2}$	$x^2 + (x+1)^2 = 25$ (P1); $x = 3, -4$ (P1); points $(3,4)$, $(-4,-3)$ (P1); $\sqrt{98}$ (A1).
2	$(10,0)$	Radius gradient 2 (P1); tangent $-\frac{1}{2}$ (P1); $y = -\frac{1}{2}x + 5$ (P1); A1.
3	36	Vertices $(\pm 3, \pm 3)$ (P1, P1); A1.
4	± 5	$k^2 = 25$ (P1); A1.
5	20π	$r = 10$ (P1); A1.
6	Yes	Meets only at $(0, 10)$ (P1); C1.
7	16π	$25\pi - 9\pi$ (P1, P1); A1.