Circles and other simple relations

6 questions | 12 marks

Equivalent correct methods earn the corresponding marks.

1. State the centre and radius of $(x-4)^2+(y+1)^2=9$. [2 marks]

Read the bracket signs and take the positive square root of 9.

Answer: Centre (4,-1), radius 3.

2. Write the equation of a circle centred at (-2,3) with radius 5. [2 marks]

Insert h=-2, k=3 and r²=25.

Answer: $(x+2)^2+(y-3)^2=25$.

3. Does (3,4) lie on $x^2+y^2=25$? Explain. [2 marks]

$3^2+4^2=9+16=25$.

Answer: Yes.

4. Find the x-intercepts of $(x-1)^2+y^2=9$. [2 marks]

Set y=0: $(x-1)^2=9$, so $x-1=\pm3$.

Answer: (-2,0) and (4,0).

5. Write the lower semicircle of $x^2+y^2=16$, including domain and range. [2 marks]

Select the negative square-root branch.

Its x-values run across the diameter, while its outputs run from -4 to 0.

Answer: $y=-\sqrt{16-x^2}$; domain $[-4,4]$, range $[-4,0]$.

6. A circular sprinkler reaches 6 m from a nozzle at (2,1) on a metre grid. Give its boundary equation and decide whether (7,4) lies inside. [2 marks]

Its squared distance from the nozzle is $5^2+3^2=34<36$.

Thus its distance is less than 6 m.

Answer: Boundary $(x-2)^2+(y-1)^2=36$; (7,4) is inside.