

Writing and Graphing Circle Equations

Grade 10 – Geometry math · Test Answer Key · Standards: G-GPE.A.1

Each solution shows the center, the value of r^2 and the final equation. The scoring notes show how partial credit is earned for the center, the radius and the conclusion.

Standards: G-GPE.A.1 · **Level:** Grade 10 Geometry

Question 1 Write the Equation (2 points)

$$r^2 = (3\sqrt{2})^2 = 18.$$

$$(x + 4)^2 + (y - 7)^2 = 18$$

Scoring: 1 point for r^2 , 1 point for the signs of the center.

Question 2 Read the Equation (2 points)

Center $(-7, 3)$. Radius $\sqrt{50} = 5\sqrt{2}$.

Center $(-7, 3)$; radius $5\sqrt{2}$

Scoring: 1 point for the center, 1 point for the radius.

Question 3 Circle from a Diameter (3 points)

$$\text{Center} = \left(\frac{(-3 + 9)}{2}, \frac{(-5 + 1)}{2} \right) = (3, -2).$$

$$r^2 = (9 - 3)^2 + (1 + 2)^2 = 36 + 9 = 45.$$

$$(x - 3)^2 + (y + 2)^2 = 45$$

Scoring: 1 point for the center, 1 point for r^2 , 1 point for the equation.

Question 4 Complete the Square (3 points)

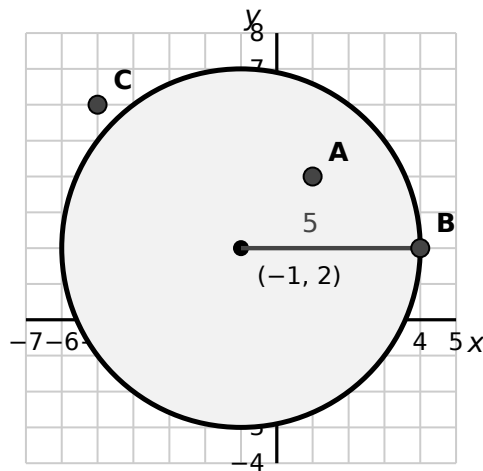
$$(x^2 + 10x + 25) + (y^2 - 6y + 9) = 2 + 25 + 9 = 36.$$

$$(x + 5)^2 + (y - 3)^2 = 36.$$

Center $(-5, 3)$, radius 6

Scoring: 1 point for each added constant, 1 point for the standard form and center and radius.

Question 5 Inside or Outside (3 points)



A inside, B on, C outside.

Equation: $(x + 1)^2 + (y - 2)^2 = 25$.

A(1, 4): $4 + 4 = 8$, less than 25, inside.

B(4, 2): $25 + 0 = 25$, on the circle.

C(-5, 6): $16 + 16 = 32$, greater than 25, outside.

A inside, B on, C outside

Scoring: 1 point for the equation, 1 point for A and B, 1 point for C and correct reasoning.

Question 6 Radio Station Range (3 points)

(a) $(x - 7)^2 + (y + 2)^2 = 81$.

(b) $(1 - 7)^2 + (4 + 2)^2 = 36 + 36 = 72$, which is less than 81, so the school is in range.

(a) $(x - 7)^2 + (y + 2)^2 = 81$ (b) Yes

Scoring: 1 point for the equation, 1 point for the distance squared, 1 point for the conclusion.

Question 7 Tangent to Both Axes (2 points)

In the second quadrant x is negative and y is positive, so the center is (-9, 9).

$(x + 9)^2 + (y - 9)^2 = 81$

Scoring: 1 point for the center, 1 point for the equation.

Question 8 Read a Graph (2 points)

The center is $(-3, -2)$. The rightmost point is $(0, -2)$, 3 units from the center, so $r = 3$.

$$(x + 3)^2 + (y + 2)^2 = 9$$

Scoring: 1 point for the center, 1 point for the radius and equation.