

Answer on Question #57172 – Math – Analytic Geometry

Question

1. Identify the center and radius of the circle $(x + 2)^2 + (y - 3)^2 = 9$. Check all that apply:

Center: (2, -3), $r = 3$

Center: (2, -3), $r = 9$

Center: (-2, 3), $r = 3$

Center: (-3, 2), $r = 9$

Solution

Equation of the circle:

$$(x - a)^2 + (y - b)^2 = r^2,$$

where $O(a; b)$ is the center, r is the radius.

Equation of the circle in this question^

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

where $(-2, 3)$ is the center, $r = 3$ is the radius.

Answer: center: $(-2, 3)$, radius: $r = 3$.

Question

2. What is the radius of a circle with the equation $x^2 + y^2 + 2x + 4y - 9 = 0$. Round your answer to the nearest thousandth.

Solution

Equation of the circle:

$$(x - a)^2 + (y - b)^2 = r^2$$

$$x^2 + y^2 + 2x + 4y - 9 = 0$$

$$x^2 + 2x + y^2 + 4y = 9$$

$$(x^2 + 2 \cdot 1 \cdot x + 1^2) + (y^2 + 2 \cdot 2 \cdot y + 2^2) = (1^2 + 2^2 + 9)$$

$$(x + 1)^2 + (y + 2)^2 = 14$$

$$(x + 1)^2 + (y + 2)^2 = (\sqrt{14})^2$$

$$r = \sqrt{14} \approx 3.742.$$

Answer: $r = 3.742$.

Question

3. Which of the following is a degenerate circle? Check all that apply:

$$x + y = 7$$

$$x^2 + y^2 = -2$$

$$x^2 + y^2 = 5$$

$$(x - 5)^2 + (y - 3)^2 = 0$$

Solution

A degenerate circle is a circle of zero radius.

$x + y = 7$ is a straight line.

$x^2 + y^2 = -2$ is an imaginary circle, because $r^2 = -2 < 0$.

$x^2 + y^2 = 5$ is a circle, $r = \sqrt{5}$.

$(x - 5)^2 + (y - 3)^2 = 0$ is a degenerate circle, because $r = 0$.

Answer: $(x - 5)^2 + (y - 3)^2 = 0$ is a degenerate circle.