# Chapter 1.4 Check Your Understanding

***Exercises 1–7 True or False. Give reasons.***

**1.** The graph of $x^2 + y^2 + 2x + 1 = 0$ is a single point.

**Answer:**

True; complete the square on x terms: $(x + 1)^2 + y^2 = 0$. The only point that satisfies the equation is $(-1, 0)$.

**2.** The point $(1, -2)$ is the center of the circle whose equation is $x^2 + y^2 + 2x - 4y = 0$.

**Answer:**

False; complete the squares: $(x + 1)^2 + (y - 2)^2 = 5$. Center is at $(-1, 2)$.

**3.** The graph of $x^2 + y^2 - 2x = 0$ is a circle with diameter 2.

**Answer:**

True; complete the square on x terms; $(x - 1)^2 + y^2 = 1$. The radius is 1 and so the diameter is 2.

**4.** If the graphs of $5x - 2y = 4$ and $3x + y = 20$ are drawn simultaneously using the window $[-10, 10]$ by $[-5, 5]$, the display will show two lines intersecting at a point on the screen.

**Answer:**

False; draw the graphs of $y = \frac{5x-4}{2}$ and $y = 20 - 3x$ using $[-10, 10] \times [-5, 5]$.

**5.** When the graphs of $2x + 3y = 12$ and $x^2 + y^2 = 8$ are drawn simultaneously using the window $[-9.4, 9.6]$ by $[-6.2, 6.4]$, the display will show a line and a circle intersecting at two points.

**Answer:**

False; the graphs do not intersect.

**6.** There is no real number $c$ such that the point $(1, c)$ is 1 unit from $(-1, 2)$. (*Hint:* Think geometrically.)

**Answer:**

True; the point (1, c) is on the vertical line $x = 1$. All points on the line $x = 1$ are at least 2 units from $(-1, 2)$.

**7.** There are two numbers $c$ for which the point $(1, c)$ is 4 units from $(-1, 2)$. (*Hint:* Think geometrically.)

**Answer:**

True; draw the vertical line $x = 1$ and it is easy to see that there are two points on it that are 4 units from $(-1, 2)$.

***Exercises 8–10 Fill in the blank so that the resulting statement is true.***

**8.** The graph of $x^2 + y^2 - 2x + 4y - 5 = 0$ is a circle having center in Quadrant _____.

**Answer:**

Complete squares, $(x - 1)^2 + (y + 2)^2 = 10$. The center is at $(1, -2)$ in QIV.

**9.** If $(a, b)$ is any point in the second quadrant, then $(b, a)$ is in Quadrant _____.

**Answer:**

IV; if (a, b) is in QII, then $a < 0$ and $b > 0$. Thus (b, a) is in QIV.

**10.** The graph of $x + y - 1 = 0$ does not contain any points in Quadrant _____.

**Answer:**

Draw a graph of $y = 1 - x$ (a line) and see that there are no points on the graph in QIII.