4 The Cartesian Coordinate Practice Problems

1. Is $(3, 2)$ on the graph of $x^2 - y^3 = 1$? **Yes.**

2. Is $(0, 1)$ on the graph of $x^2 - y^3 = 1$? **No.**

3. Is $(0, -1)$ on the graph of $x^2 - y^3 = 1$? **Yes.**

4. Find the intercepts of the graph of $x^2 - y^3 = 1$.

   x-intercepts: $(-1, 0)$ **and** $(1, 0)$**; y-intercept:** $(0, -1)$

5. Find the point on the x-axis that is equidistant to $(2, 5)$ and $(-1, 3)$.

   $\mathbf{\left(\frac{19}{6}, 0\right)}$

6. Find the point on the y-axis that is equidistant to $(2, 5)$ and $(-1, 3)$.

   $\mathbf{\left(0, \frac{19}{4}\right)}$

7. Find the area of the triangle with vertices $A(-2, -5)$, $B(-2, 7)$, and $C(10, 10)$. **72**

8. Show that the triangle whose vertices are $A(4, 15)$, $B(12, 7)$, and $C(-1, 2)$ is isosceles.

   $\mathbf{\overline{AC} = \overline{BC} = \sqrt{194}}$

9. Sketch the graph of the circle defined by $(x + 5)^2 + y^2 = 16$. What are the center and radius of this circle? **Center:** $(-5, 0)$**; Radius:** 4

10. Is the graph of $x^2 + 6x + y^2 - 10y + 26 = 0$ a circle? If so, find its center and radius.

    Yes, the equation is equivalent to $(x + 3)^2 + (y - 5)^2 = 8$**.**
    Center: $(-3, 5)$**; Radius:** $\sqrt{8}$**.**

11. Is the graph of $4x^2 - 8x + 4y^2 + 4y - 23 = 0$ a circle? If so, find its center and radius.

    Yes, the equation is equivalent to $(x - 1)^2 + (y + \frac{1}{2}) = 7$**.**
    Center: $(1, -\frac{1}{2})$**; Radius:** $\sqrt{7}$**.**

12. Is the graph of $x^2 - 2x + y^2 + 8y + 26 = 0$ a circle? If so, find its center and radius.

    No, the equation is equivalent to $(x - 1)^2 + (y + 4)^2 = -9$**, which is not an equation of a circle.**

13. Describe the graph of $x^2 + 4x + y^2 + 10y + 29 = 0$.

    The equation is equivalent to the standard equation of a circle with center $(-2, -5)$ **and radius** 0**. Thus, the graph is the single point** $(-2, -5)$**.**

14. A diameter of a circle has endpoints $(1, -2)$ and $(3, 6)$. Find an equation for the circle.

    $\mathbf{(x - 2)^2 + (y - 2)^2 = 17}$

15. The center of a circle is $(5, -2)$, and circle passes through the point $(-2, 3)$. Find an equation for the circle.

    $\mathbf{(x-5)^2 + (y+2)^2 = 74}$

16. **TRUE or FALSE:** The line through the points $(0, -1)$ and $(-1, 4)$ is perpendicular to the line through the points $(2, -8)$ and $(7, -7)$. **True**

17. **TRUE or FALSE:** The line through the points $(-5, -7)$ and $(-8, -5)$ is parallel to the line through the points $(-7, 0)$ and $(-10, 2)$. **True**

18. Find the intercept(s) of the graph of $(x-1)^2 + (y+5)^2 = 17$.

    No x-intercepts. Two y-intercepts: $(0, -1)$ **and** $(0, -9)$**.**

19. The center of a circle is $(4, -5)$ and the circle intersects the x-axis at 2 and 6. Find an equation for the circle.

    $\mathbf{(x-4)^2 + (y+5)^2 = 29}$

20. For each point, determine if the point is inside, outside, or on the circle

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

    (a) $(4, 2)$ **outside the circle**

    (b) $(-5, 0)$ **inside the circle**

    (c) $(1, 2)$ **outside the circle**

21. Which of the following are equations for the line through the points $P(1, 5)$ and $Q(2, -3)$? **The answers are in bold.**

    (a) $\mathbf{y + 3 = -8(x-2)}$

    (b) $y = -8x - 4$

    (c) $\mathbf{y = -8(x-1) + 5}$

    (d) $y + 3 = \dfrac{-1}{8}(x-2)$

    (e) $y + 3 = \dfrac{1}{8}(x-2)$

    (f) $y - 5 = \dfrac{-1}{8}(x-1)$

    (g) $y - 5 = \dfrac{1}{8}(x-1)$

    (h) $\mathbf{y - 5 = -8(x-1)}$

    (i) $y + 5 = -8(x+1)$

    (j) $y - 5 = -8x - 1$

    (k) $y - 5 = \dfrac{-1}{8}x - 1$

22. Find an equation for the line that is parallel to $y = \frac{5}{6}x + 4$ and passes through the point (0,12).

    $\mathbf{y = \frac{5}{6}x + 12}$

23. Find an equation for the line that is parallel to $y = \frac{5}{6}x + 7$ and contains the point (3,21).

    $\mathbf{y - 21 = \frac{5}{6}(x - 3)}$

24. Find an equation for the line that is perpendicular to $y = \frac{5}{6}x + 4$ and contains the point (0,14).

    $\mathbf{y = -\frac{6}{5}x + 14}$