

1 Section: 1.5

Exercise 1 Find the solution set of the following inequalities:

$$\begin{array}{llll} 1) |2x+3|+4 \leq 9 & 2) 4m^3+7m^2-2m \leq 0 & 3) \frac{x^2+10x+25}{x^2-x-12} \leq 0 & 4) \frac{(x+1)^{10}(x-2)^9}{(x+7)^6} \leq 0 \\ 5) |2x+7| \leq 0 & 6) |2x+7| < 0 & 7) |x-7| \geq 0 & \\ 8) |x-7| > 0 & 9) |2x-1| < -9 & 10) |2x+7| \geq -5 & 11) |x^2-8| \leq 1 \\ 12) |x^2-1| > 1 & 13) x^2+x+2 < 0 & 14) x^2+x+2 > 0 & \\ 15) \frac{(x-5)(x^2+1)(x-3)^2}{(4-x)^3} \leq 0 & 16) 1 < |x+1| < 2 & 17) \frac{7x+6}{6} > \frac{x+2}{2} \text{ or } 4(x+4) > 2(2-x) & 18) 2x+5 > 1 \text{ and } 7x+6 \leq 3(x+2). \end{array}$$

Exercise 2 Find the values of k such that the equation $2x^2+kx+7=0$ has 1) at least one real solution 2) two distinct non-real solutions 3) two distinct real solutions.

2 Section 2.1

Exercise 3 Graph the set of all points whose x - and y -coordinates satisfy the given conditions:

$$1) y = 2. \quad 2) x \geq 2. \quad 3) x \geq 1, |y| \leq 3. \quad 4) xy \geq 0. \quad 5) |x+4| \leq 1 \text{ and } 0 \leq y+2 \leq 1.$$

Exercise 4 Find the x -intercepts of the function $f(x) = -x^4 + 2x^3 + 3x^2$.

Exercise 5 Find the value of k in interval notation for which the function $y = kx^2 - 8x + 4$ has no x -intercept.

Exercise 6 If the point (a, b) is in the fourth quadrant, then $(b, -a)$ lies in which quadrant.

Exercise 7 If $(-2, 20)$ is the midpoint of the line segment joining (a, b) and $(\frac{-a}{2}, \frac{2b}{3})$, then find the value of a and b .

Exercise 8 If (x, y) is equidistant from $(1, 1)$ and $(3, 3)$, then find $x + y$.

Exercise 9 If the points $(0, -5)$ and (a, b) are the endpoints of a diameter of the circle $(x-1)^2 + (y+2)^2 = 10$, then find the value of a and b .

Exercise 10 What does the equation $2x^2 - 8x + 2y^2 + 26 = 0$ represent? (ans: no graph)

Exercise 11 What does the equation $x^2 - 8x + y^2 + 10y = -41$ represent? (ans: the point $(4, -5)$)

Exercise 12 If the point $(3, B)$ lies on the circle $x^2 - 2x + y^2 + 6y + 5 = 0$, then find the value of B . (ans: $\{-4, -2\}$)

Exercise 13 Let M be the midpoint of the line whose endpoints are at $(1, -2)$ and $(-3, 6)$, and let C be the center of the circle $x^2 + 4x + y^2 - 8y + 2 = 0$. Then, find the distance between M and C . (ans: $\sqrt{5}$)

Exercise 14 Find the points (x, y) with $y = -x$ that are 4 units from the point $(1, 3)$. (ans: $\{(-3, 3), (1, -1)\}$)

Exercise 15 If the distance between the points $A(1, 3)$ and $B(x, 2x)$ is $\sqrt{2}$, then find the value of x . (ans: $\frac{4}{5}$ or 2)

Exercise 16 If the center of the circle $x^2 + 4x + y^2 - 6y = -9$ is $(2a+1, 2b-1)$, then find the value of a and b .

Exercise 17 If a point (a, b) lies in the second quadrant, then the point $(4, ab)$ lies in which quadrant.