12.1

13 Questions

3) Which of the points $A(-4, 0, -1)$, $B(3, 1, -5)$, and $C(2, 4, 6)$, is the closest to the yz-plane? Which point lies in the xz-plane?

Answers

3) C; A

5) A line parallel to the y-axis and 4 unites to the right of it; a vertical plane parallel to the yz-plane and 4 units in front of it.

7) A vertical plane the intersects the xy-plane in the line $y = 2 - x$, $z = 0$

9) 6

11) $|PQ| = 6$, $|QR| = 2\sqrt{10}$, $|RP| = 6$; isosceles triangle

27) A horizontal plane 2 units below the xy-plane

29) A half-space consisting of all points on or to the right of the plane $y = 1$

31) All points on or between the vertical planes $x = -1$, and $x = 2$

33) All points on a circle with radius 2 and center on the z-axis that is contained in the plane $z = -1$

35) All points on or inside a circular cylinder of radius 5 with axis the x-axis

37) All points on a sphere with radius 2 and center $(0, 0, 0)$

39) All points on or between spheres with radii 1 and $\sqrt{5}$ and centers $0, 0, 0)$

5) What does the equation $x = 3$ represent in $\mathbb{R}^2$? What does it represent in $\mathbb{R}^3$? Illustrate with sketches.

7) Describe and sketch the surface in $\mathbb{R}^3$, represented by the equation $x + y = 2$.

39) $1 \leq x^2 + y^2 + z^2 \leq 5$

37) $x^2 + y^2 + z^2 = 4$

9) Find the distance between the given points: $(3, 5, -2)$, $(-1, 1, -4)$

11) Find the lengths of the sides of the triangle PQR. Is it a right triangle? Is it an isosceles triangle? $P(3, -2, -3)$, $Q(7, 0, 1)$, $R(1, 2, 1)$

35) $y^2 + z^2 \leq 25$

33) $x^2 + y^2 = 1, z = -1$

27-39) Describe in words the region of $\mathbb{R}^3$ represent by the equation(s) or inequalities.

27) $z = -2$

29) $y \geq 1$

31) $-1 \leq x \leq 2$