1.9.17

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Question:

Write the coordinates of a point **P** on the x-axis which is equidistant from the points $\mathbf{A}(-2,0)$ and $\mathbf{B}(6,0)$.

Solution:

Let the point P be on the x-axis with coordinates:

$$P(x,0) \tag{1}$$

Since P is equidistant from A and B, their distances from P are equal:

$$PA = PB \tag{2}$$

Using the distance formula:

$$\sqrt{(x+2)^2+(0-0)^2} = \sqrt{(x-6)^2+(0-0)^2} \tag{3}$$

This simplifies to:

$$|x+2| = |x-6| \tag{4}$$

Consider two cases:

Case 1:

$$x+2 = x-6 \quad \Rightarrow \quad 2 = -6 \quad \text{(Not possible)} \tag{5}$$

Case 2:

$$x+2 = -(x-6) \tag{6}$$

$$x+2 = -x+6$$

$$2x = 4 \quad \Rightarrow \quad x = 2$$

Therefore, the coordinates of point P are:

$$\boxed{(2,0)} \tag{7}$$

Graphical Representation: