

1) Determine whether the following statement is true or false. Provide a brief explanation.

$$\forall x \in \mathbb{R} (x^3 \geq 0)$$

This is false. We see in particular that it is not true for $x = -2$:

$$(-2)^3 = -8 \not\geq 0$$

2) Determine whether the following statement is true or false. Provide a brief explanation.

$$\exists x, y \in \mathbb{R} (x = y + 2)$$

This is true. We see in particular that such as x and y are $x = 3, y = 1$:

$$3 = 1 + 2$$