Class 4 Lecture Assignment

Complete this groupwork and submit it to Gradescope by 4:00pm on your class day. You can print this sheet, or write on your own paper. Contact us if internet connections or other issues require alternate arrangements.

Note: On this sheet, any number is assumed to be real. There is no need to incorporate "$x \in \mathbb{R}$" into your statements.

1. Rewrite the following statements in logical notation. Use quantifiers and symbols whenever possible and determine if each statement is true or false.

   (a) For all negative numbers x, x^3 is a negative number.

   $\forall x < 0,\ x^3 < 0$

   (b) There exists a number x such that for all y, the quantity $x \times y$ is 1.

   $\exists x\, \exists \forall y,\ xy = 1$

2. Rewrite the following statements in English. Avoid quantifiers and symbols whenever possible and determine if each statement is true or false.

   (a) $\forall x, \forall y, x \leq y$.

   For all x, and for all y, x is less than or equal to y

   (b) $\exists x\, \exists \forall y, x \leq y$.

   There exists an x such that for all y, x is less than or equal to y.

3. **One-minute questions:** Write a sentence for each.

   (a) What is one interesting thing you learned from the book or videos?

   I thought the precise def. of limits was very interesting

   (b) What is one mathematical question you have about this week's material?

   Is there any special significance to greek letters rather than english variables?