

Intro to Calculus

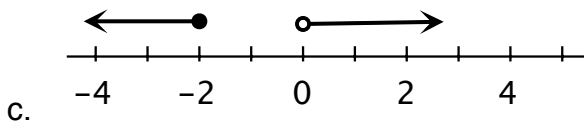
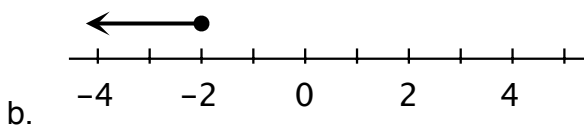
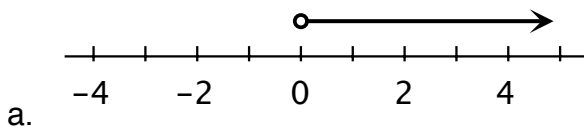
Homework 2¹

Goals

I can:
Translate between English, number line graphs, and inequality statements involving absolute value.

1. Translate the following English statements concerning points on a number line into algebraic statements involving absolute value. Do not solve.
 - a. The distance from x to 2 is 4.
 - b. The distance from x to 5 is less than 3.
 - c. x is at most 17 units from 8.
 - d. c is closer to 0 than b is.
 - e. d is no further than 2 from 6.
 - f. k is nearer to 7 than -2 .
 - g. m is further from -6 than from -5 .
 - h. d is at least 5 from 9.

2. Translate each of the following into both English and inequality statement.



¹ This work is based on material from Prof. Scott Farrand, CSU Sacramento

Name _____

Date _____

Class # _____

Block _____

3. Translate the given algebraic statements involving absolute value into an English statements about points on a number line.
- a. $|x| = 1$ b. $|x - 2| = 3$ c. $|x + \pi| = 4$
- d. $|x| < 7$ e. $|x - 5| < 2$ f. $|x + 7| \geq 3$
- g. $|x - 1| = |x - 5|$ h. $|x + 2| < |x - 3|$ i. $|x - 2| > |x + 3|$
4. For each of the following, write an absolute value inequality whose solution is the specified interval.
- a. $[19, 37]$ b. $(-12, 22)$
- c. $(-\infty, -1) \cup (8, \infty)$ d. $(-\infty, -41] \cup [-11, \infty)$
5. A student wrote " $[-\infty, 8)$ " as an answer to a problem. Write a brief note to the student to help him understand what he did wrong and why it is wrong.
6. a. "Normal" human body temperature is 98.6°F . A temperature x is considered unhealthy if it differs from normal by at least 1.5°F . Write an inequality statement involving absolute value to describe "normal" human body temperature.
- b. In the United States, normal household voltage is 115 volts. However, it is not uncommon for actual voltage to differ from normal by at most 5 volts. Write an inequality statement involving absolute value which describes normal household voltage.
- c. A sheet of steel is to be 0.375 inches thick within a tolerance of 0.012 inches. Express this specification using inequality notation involving absolute value. Let x represent the thickness of the sheet of steel.
7. Describe the given condition with an absolute value inequality.
- a. A scale is never off its measurement by more than 2 pounds. The scale indicates that a person weighs 145 pounds. (Let w = the person's weight.)
- b. A freezer is most efficient when the temperature is 17°F plus or minus 6° . (Let t = the temperature of the freezer.)

Name _____ Date _____ Class # _____ Block _____

- c. A housing inspector approves residential wiring if the incoming voltage deviates from 110 volts by less than 3 volts.
 - d. A recent poll predicted that 45% of the voting population endorsed presidential candidate John McCain. The poll had a stated error of plus or minus 3%.
8. Create your own statement, written in both English and inequality notation involving absolute value, like those in problem 7.
9. Try to write an absolute value inequality whose solution is $(-\infty, -12] \cup (5, \infty)$. Describe any difficulties you experience.
10. Consider the statement:
“The number of students who receive a grade of “A” is never more than 10.”
Is there a problem with trying to express this statement as an absolute value inequality? Explain.