**Notes:**

**Absolute value equations:**

To solve an absolute value equation, isolate the absolute value on one side of the equal sign, and establish two cases:

|  |  |
| --- | --- |
| **Case 1:**  |a| = b  a = b Set the expression inside the absolute value symbol equal to the other given expression. | **Case 2:**  |a| = b  a = -b  Set the expression inside the  absolute value symbol equal to the negation of the other given  expression |

**Absolute value inequalities:**

Start by isolating the absolute value on one side of the inequality symbol, then follow the rules below:

If the symbol is

If then the solutions to are or

(or) if all real numbers will satisfy

**Think about it:** absolute value is always positive (or zero), so , of course, it is greater than any negative number.

If the symbol is(0r≥)

If then the solutions to and

Also written as :

(and) if there is no solution to

**Think about it:** absolute value is always positive (or zero), so , of course, it cannot be less than a negative number.

**Questions:**

* 1. Solve the following equation for x

|x + 5| = 9

Case 1 Case 2

x + 5 = 9 x + 5 = 9

x = 4 x = 14

* 1. Solve the following equation for x

2|x 4| + 9 = 19

2 |x – 4| = 10

|x – 4| = 5

Case 1 Case 2

x – 4 = 5 x 4 = 5

x = 9 x = 1

* 1. Solve the following inequality for x

|-x + 4| 610

|-x + 4| 60

Case 1 Case 2

x + 4 > 60 x + 4 < 60

4 – 60 > x 60 + 4 < x

56 > x 64 < x

So x < 56   or   x > 64

-50 0 50 100

* 1. Solve the following inequality for x

|x + 10| + 5 ≤ 20

|x + 10| ≤ 15

Case 1 Case 2

x + 10 ≤ 15 x + 10 ≥ 15

x ≤ 5 x ≥ 25

So 25 ≤ x ≤ 5

-25 -2 0 -15 -10 -5 0 5