

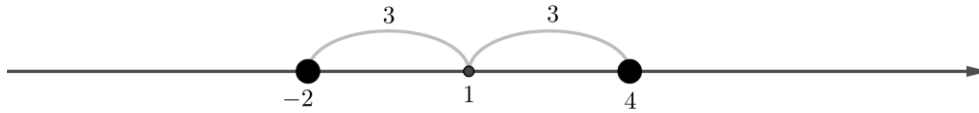
Simple equations and inequalities with absolute value | **Answers**

Solve the following equations and inequalities

1. $|x - 1| = 3$

Solution

The distance x from 1 has to be equal 3.

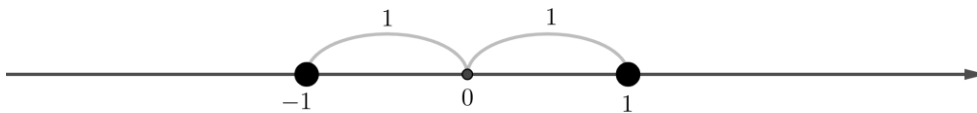


Answer: $x \in \{-2, 4\}$

2. $|x| = 1$

Solution

The distance x from 0 has to be equal 1.

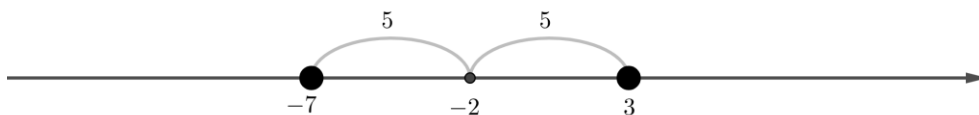


Answer: $x \in \{-1, 1\}$

3. $|x + 2| = 5$

Solution

The distance x from -2 has to be equal 5.



Answer: $x \in \{-7, 3\}$

Simple equations and inequalities with absolute value | Answers

4. $2|4 - x| - 1 = 0$

Solution

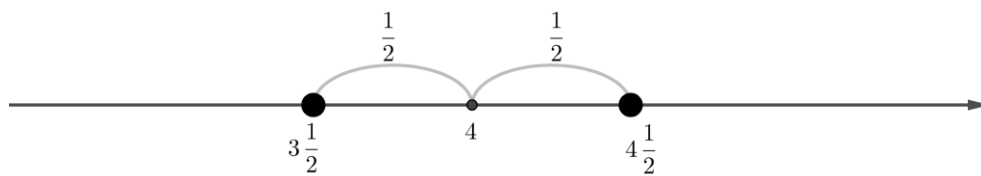
$$2|4 - x| - 1 = 0$$

$$2|4 - x| = 1$$

$$|4 - x| = \frac{1}{2}$$

$$|x - 4| = \frac{1}{2}$$

The distance x from 4 has to be equal $\frac{1}{2}$.



Answer: $x \in \left\{3\frac{1}{2}, 4\frac{1}{2}\right\}$

5. $3 - 2|-3 - x| = 0$

Solution

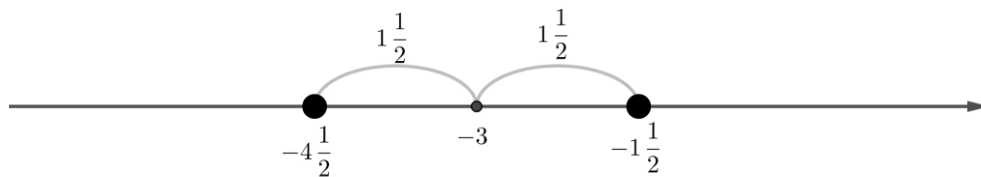
$$3 - 2|-3 - x| \leq 0$$

$$3 - 2|x + 3| \leq 0$$

$$-2|x + 3| = -3$$

$$|x + 3| = 1\frac{1}{2}$$

The distance x from -3 has to be equal $1\frac{1}{2}$.



Answer: $x \in \left\{3\frac{1}{2}, 4\frac{1}{2}\right\}$

Simple equations and inequalities with absolute value | Answers

6. $|x - 4| = -5$

Solution

No number satisfies this equation because the absolute value cannot be negative (likewise the distance cannot be negative).

Answer: $x \in \emptyset$

7. $|x - 9| = 0$

Solution

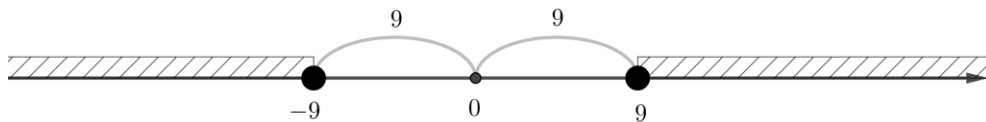
The distance x from 9 has to be equal 0, so x must be 9.

Answer: $x \in \{9\}$

8. $|x| \geq 9$

Solution

The distance x from 0 has to be greater than or equal to 9.

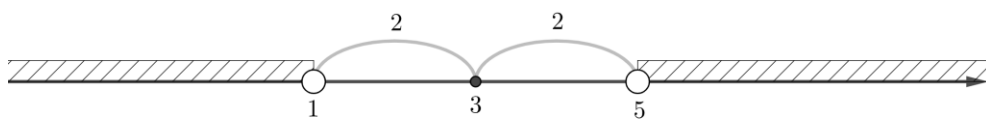


Answer: $x \in (-\infty, -9] \cup [9, \infty)$

9. $|x - 3| > 2$

Solution

The distance x from 0 has to be greater than 2.



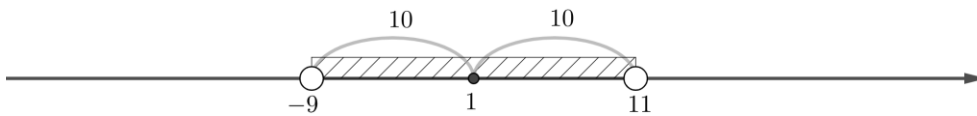
Answer: $x \in (-\infty, 1) \cup (5, \infty)$

Simple equations and inequalities with absolute value | **Answers**

10. $|x - 1| < 10$

Solution

The distance x from 1 has to be less than 10.

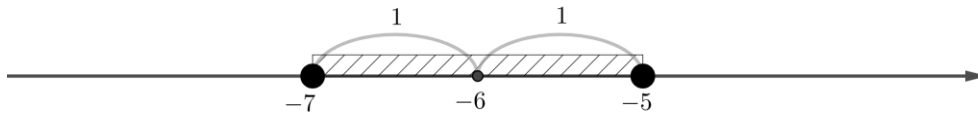


Answer: $x \in (-9, 11)$

11. $|x + 6| \leq 1$

Solution

The distance x from -6 has to be less than or equal to 1.

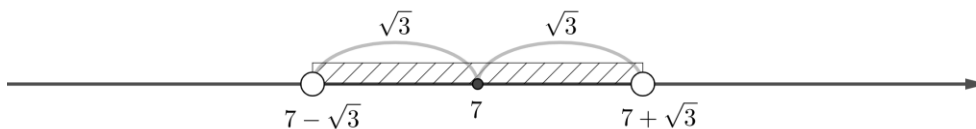


Answer: $x \in [-7, -5]$

12. $|x - 7| < \sqrt{3}$

Solution

The distance x from 7 has to be less than $\sqrt{3}$.



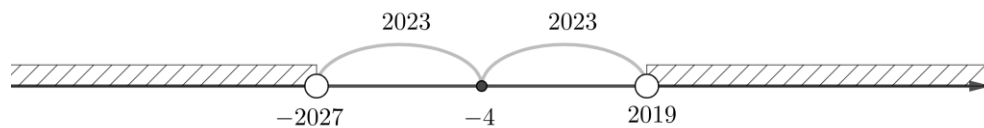
Answer: $x \in (7 - \sqrt{3}, 7 + \sqrt{3})$

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13. $|x + 4| \geq 2023$

Solution

The distance x from -4 has to be greater than or equal to 2023 .



Answer: $x \in (-\infty, -2027] \cup [2019, \infty)$