

1.8: Solving Absolute value equations and Inequalities

1. The sum of all the solutions of $-\frac{3}{2}|x - 7| - \frac{5}{2} = -7$, is equal to

A) 14

B) 12

C) -14

D) 6

E) - 6

2. The sum of all the solutions of the equation $|x - 2|^2 - |2 - x| = 6$ is

A) 4

B) 8

C) -1

D) - 8

E) 1

3. If $(-\infty, m) \cup (n, \infty)$ is the solution set of the inequality $\left| \frac{5}{3} - \frac{1}{2}x \right| + \frac{1}{3} > \frac{4}{3}$, then $n - m =$

A) 4

B) 15

C) $\frac{20}{3}$

D) $\frac{11}{3}$

E) -4

4. If the solution set of $|x - a| < 1 - 2a$, is $-10 < x < 4$, then $a =$

A) -3

B) -5

C) -6

D) -4

E) -7

5. If $x \leq -\frac{1}{2}$, then the solution set of the inequality $|2x - 1| \geq |x^2 - 2x|$, is

A) $\left[-1, -\frac{1}{2}\right]$

B) \emptyset

C) $[-2, -1]$

D) $(-\infty, -1]$

E) $\left(-\infty, -\frac{1}{2}\right]$

6. The solution set of the inequality $8 + 3\left|x - \frac{1}{2}\right| \geq 2$ is

A) $(-\infty, \infty)$

B) $\left(-\infty, -\frac{3}{2}\right] \cup \left[\frac{5}{2}, \infty\right)$

C) $\left[-\frac{3}{2}, \frac{5}{2}\right]$

D) $(-\infty, 0) \cup (0, \infty)$

E) \emptyset

7. The solution set of $||x + 1| - 2| = 5$ contains

- A) two solutions
- B) one solution
- C) three solutions
- D) four solutions
- E) five solutions.

8. The sum of the solutions of the equation $\frac{|x-1|+2}{1+|x-1|} - \frac{3}{2} = 0$ is equal to

- A) 2
- B) 1
- C) 0
- D) -1
- E) -5

9. The number of solutions of the equation $|2x - 1|^3 - 5|2x - 1|^2 + |8x - 4| = 0$ is

A) 5

B) 3

C) 4

D) 0

E) 6

10. The solution set in interval notation of the inequality $\left| \frac{1}{2} - 2x \right| \geq \frac{1}{2}$ is

A) $(-\infty, 0] \cup [1/2, \infty)$

B) $(-\infty, 0] \cup [1, \infty)$

C) $(-\infty, 1/4] \cup [1/2, \infty)$

D) $(-\infty, 0] \cup [1/4, \infty)$

E) $(-\infty, 1/2) \cup [1, \infty)$

11. The solution set of the compound inequality $-3|x| + 6 < 12$ and $8 - |2x - 1| \geq 6$ is equal to

A) $[-1/2, 3/2]$

B) $(-\infty, \infty)$

C) $[-1/2, 0) \cup (0, 3/2]$

D) $(-\infty, 1/2] \cup [3/2, \infty)$

E) the empty set \emptyset

12. If the solution of $\left|x + \frac{6}{k+1}\right| \leq \frac{3}{k+1}$ is $[-3, -1]$, then $k =$

A) $\{2\}$

B) $\{2, -3\}$

C) $\{-1/2, 2\}$

D) $\{-2, -4\}$

E) \emptyset

13. The sum of all solutions of the equation $\frac{5}{2} - 4|3x - 6| = -\frac{19}{3}$

A) 4

14. If $|3 - 2x| \leq 5$ is equivalent to $m \leq 5x + 2 \leq n$,

A) $m = -3$ and $n = 22$

15. The solution set of the equation $\frac{2|x+2|}{3} - \frac{1}{2} = \frac{4x+5}{6}$

A) $[-2, \infty)$

16. The solution set, in interval notation, of the inequality $2 < |x - 1| < 3$ is equal to

A) $(-2, -1) \cup (3, 4)$

17. If A is the solution set of $|3 - 2x| \leq 5$ and B is the solution set of $|x - 2| > 1$, then $A \cap B =$

A) $[-1, 1) \cup (3, 4]$

18. Let A be the solution set of the inequality $4|x - 3| > 12$, and B is the solution set of the inequality $|5 - 3x| \leq 7$, then $A \cap B =$

A) $\left[-\frac{2}{3}, 0\right)$

19. The solution set, in interval notation, of the inequality $\left| \frac{2}{3}x - 1 \right| - 2 > \frac{1}{3}$ is

A) $(-\infty, -2) \cup (5, \infty)$

20. The sum of the solutions of the equation $\left| \frac{6x+1}{x-1} \right| = 3$ is equal to

A) $-\frac{10}{9}$

21. The solution set of the equation $|-4 - 3x| = |2 - 3x|$ contains:

A) only one element

22. The solution set of the inequality $\left|\frac{1}{2}x + \frac{2}{3}\right| > 3$ in interval notation is:

A) $\left(-\infty, -\frac{22}{3}\right) \cup \left(\frac{14}{3}, \infty\right)$

23. The solution set of the equation $|5x - 1| = |2x + 3|$ contains:

A) one positive and one negative rational number

24. The solution set of the inequality $\left| \frac{2x+5}{x} \right| \leq 1$, in interval notation, is:

A) $\left[-5, -\frac{5}{3} \right]$

25. The sum of the solutions of $|(x + 2)^2| = |(x + 2)|$ is equal to

A) -6

26. The sum of all the solutions of $|x - 6|^2 - 3|x - 6| - 4 = 0$ is equal to

A) 12

B) 10

C) 25

D) 20

E) 15

27. The number of solutions of the equation $|x^2 - 2| = |x|$ is

A) 4

B) 1

C) 2

D) 5

E) 3

28. The sum of all the solutions of the equation $|x - 1| = |3x + 2|$ is

A) $-\frac{7}{4}$

B) 1

C) 0

D) $-\frac{1}{4}$

E) $-\frac{3}{2}$

29. The sum of all the solutions of the equation $|x - 1|^2 - 3|x - 1| - 4 = 0$ is

A) 2

B) 5

C) - 2

D) - 3

30. The solution set of the inequality $\left| \frac{3}{x-6} \right| > 1$ is

A) $(-\infty, 3) \cup (9, \infty)$

B) $(3, 6) \cup (6, 9)$

31. The solution set of the inequality $|x - 5| \geq -3$ is

A) $(-\infty, \infty)$

32. The solution set of the equation $\frac{1}{x+6} - \frac{|4x-7|}{x^2+5x-6} = \frac{1}{x-1}$ consists of

A) no real solution.

33. The solution set of the inequality $4 - 2 \left| x - \frac{1}{2} \right| < 5$ is

A) $(-\infty, \infty)$

B) $(-\infty, \frac{1}{2})$

C) $[0, 1]$

D) \emptyset

E) $(-\frac{1}{2}, \infty)$

34. The number of the solution(s) for the equation $|x + 3|^2 + |x + 3| = 0$ is equal to

A) 1

B) 0

C) 2

D) 3

E) 4

35. If $x^2|y| + y|x^2| = 0$, then

A) $x = 0$ or $y \leq 0$

B) $x = 0$ or $y > 0$

C) $x < 0$ or $y \leq 0$

D) $x > 0$ or $y \geq 0$

E) $x < 0$ or $y > 0$

36. The solution set of the absolute value inequality $|x|^2 + |x| \geq 2$, is

A) $(-\infty, -1] \cup [1, \infty)$

B) $(-\infty, -2] \cup [1, \infty)$

C) $(-\infty, -2] \cup [2, \infty)$

D) $(-\infty, -1]$

E) $(-\infty, -2]$

37. If $x < 3$, then $\sqrt{x^2 - 6x + 9} - x - 2 =$

A) $2x - 1$

B) $-2x + 1$

C) -5

D) -1

E) 1