

Solving Inequalities

1) The **solution** set, in interval notation, of the inequality $\frac{1}{x-3} \geq \frac{1}{x-5}$, is

- A) $(3, 5)$
- B) $(-\infty, 3) \cup (5, \infty)$
- C) $(-5, -3)$
- D) $[3, 5]$
- E) $(-\infty, -5) \cup (-3, \infty)$

2) The solution set of the inequality $\frac{x}{2} \geq \frac{2}{x}$, is

- A) $[-2, 0) \cup [2, \infty)$
- B) $(-\infty, -2] \cup (0, 2]$
- C) $(-\infty, -2] \cup [0, 2]$
- D) $[-2, 0] \cup [2, \infty)$
- E) $(-\infty, -1] \cup (1, \infty)$

3) The solution set of the inequality $-\frac{1}{2} \leq \frac{4-3x}{5} \leq \frac{1}{4}$, is

- A) $\left[\frac{11}{12}, \frac{13}{6}\right]$
- B) $\left[\frac{5}{12}, \frac{5}{6}\right]$
- C) $\left[\frac{13}{12}, \frac{13}{6}\right]$
- D) $\left[\frac{11}{10}, \frac{13}{5}\right]$
- E) $\left[\frac{13}{6}, \frac{11}{5}\right]$

4) The solution set in interval notation for the inequality $\frac{3}{x-2} < 1$ is

- (a) $(-\infty, 2) \cup (5, \infty)$
- (b) $(-\infty, 2) \cup (2, \infty)$
- (c) $(2, 5)$
- (d) $(2, \infty)$
- (e) $(5, \infty)$

5) The solution set of the inequality $x^3 + 4x^2 - 9x \geq 36$ in interval notation is:

- (a) $[-4, -3] \cup [3, \infty)$
- (b) $[-4, -3] \cup [4, \infty)$
- (c) $(-4, -3) \cup (3, \infty)$
- (d) $(-3, 3) \cup (3, \infty)$
- (e) $(3, 4) \cup (4, \infty)$

6) The solution set, in interval notation of $\frac{2x-3}{x^2-36} \leq \frac{1}{x+6}$ is

- (a) $(-\infty, -6) \cup [-3, 6)$
- (b) $(-\infty, -6) \cup [-3, \infty)$
- (c) $(-6, -3] \cup (3, 6)$
- (d) $(-\infty, 3/2) \cup [6, \infty)$
- (e) $(-6, 3/2] \cup [6, \infty)$

7) The solution set of $(x+1)(x^2+10x+25) \geq 0$ is:

- (a) $[-1, \infty) \cup \{-5\}$
- (b) $(-\infty, -5] \cup \{-1\}$
- (c) $(-\infty, -5] \cup [-1, \infty)$
- (d) $[-1, \infty)$
- (e) $(-\infty, -1]$

8) The set of all real values of k for which the equation $3x^2 - 2(k+1)x + 3 = 0$ has only nonreal solutions is:

- (a) $(-4, 2)$
- (b) $(-\infty, -4)$
- (c) $(-\infty, -4) \cup (2, \infty)$
- (d) $(-\infty, 2)$
- (e) $(-4, \infty)$

9) The solution set of $\frac{(x-2)^5(x^2+1)(x-3)^2}{(4-x)^3} \leq 0$ is:

- (a) $(-\infty, 2] \cup \{3\} \cup (4, \infty)$
- (b) $(-\infty, -1] \cup [2, 3] \cup [4, \infty)$
- (c) $(-\infty, 2] \cup [4, \infty)$
- (d) $[2, 4) \cup \{3\}$
- (e) $[-1, 2] \cup [3, 4)$

10) The solution set in interval notation for the inequality $\frac{3}{x-2} < 1$ is

- (f) $(-\infty, 2) \cup (5, \infty)$
- (g) $(-\infty, 2) \cup (2, \infty)$
- (h) $(2, 5)$
- (i) $(2, \infty)$
- (j) $(5, \infty)$

11) The solution set of the inequality $x^3 + 4x^2 - 9x \geq 36$ in interval notation is:

- (f) $[-4, -3] \cup [3, \infty)$
- (g) $[-4, -3] \cup [4, \infty)$
- (h) $(-4, -3) \cup (3, \infty)$
- (i) $(-3, 3) \cup (3, \infty)$
- (j) $(3, 4) \cup (4, \infty)$

12) The solution set, in interval notation of $\frac{2x-3}{x^2-36} \leq \frac{1}{x+6}$ is

- (f) $(-\infty, -6) \cup [-3, 6)$
- (g) $(-\infty, -6) \cup [-3, \infty)$
- (h) $(-6, -3] \cup (3, 6)$
- (i) $(-\infty, 3/2) \cup [6, \infty)$
- (j) $(-6, 3/2] \cup [6, \infty)$

13) The solution set of $(x+1)(x^2+10x+25) \geq 0$ is:

- (f) $[-1, \infty) \cup \{-5\}$
- (g) $(-\infty, -5] \cup \{-1\}$
- (h) $(-\infty, -5] \cup [-1, \infty)$
- (i) $[-1, \infty)$

14) The set of all real values of k for which the equation $3x^2 - 2(k+1)x + 3 = 0$ has only nonreal solutions is:

- (f) $(-4, 2)$
- (g) $(-\infty, -4)$
- (h) $(-\infty, -4) \cup (2, \infty)$
- (i) $(-\infty, 2)$
- (j) $(-4, \infty)$

15) The solution set of $\frac{(x-2)^5(x^2+1)(x-3)^2}{(4-x)^3} \leq 0$ is:

- (f) $(-\infty, 2] \cup \{3\} \cup (4, \infty)$
- (g) $(-\infty, -1] \cup [2, 3] \cup [4, \infty)$
- (h) $(-\infty, 2] \cup [4, \infty)$
- (i) $[2, 4) \cup \{3\}$
- (j) $[-1, 2] \cup [3, 4)$

16) The solution set, in interval notation, of the inequality $\frac{9}{x} \geq x - 8$

Answer:

$$(-\infty, -1] \cup (0, 9]$$

17) The solution set, in interval notation, of the inequality

$$\frac{-x^2 + x + 6}{(x+1)(x^2+1)} \leq 0$$

Answer:

$$[-2, -1) \cup [3, \infty)$$

18) If $|3 - 2x| \leq 5$ is equivalent to $m \leq 5x + 2 \leq n$, then

Answer: $m = -3$ and $n = 22$

19) The solution set of the compound inequality $3x + 5 > 0$ and $9x + 2 \geq 4(x + 3)$ in interval notation is

Answer: $[2, \infty)$

20) The solution set in interval notation of the inequality $\frac{5}{x-1} \leq \frac{2}{x-2}$ is

Answer: $(-\infty, 1) \cup \left(2, \frac{8}{3}\right]$

21) The solution set, in interval notation, of the inequality $\frac{x^2 - 2}{x} \geq \frac{2x + 1}{x}$ is

Answer: $[-1, 0) \cup (3, \infty]$

22) The solution set of the inequality $\frac{(9x-11)(2x+7)}{(3x-8)^3} < 0$ in interval

Answer: $\left(-\infty, -\frac{7}{2}\right) \cup \left(\frac{11}{9}, \frac{8}{3}\right)$

23) The solution set of the inequality $\frac{4}{2-x} \geq \frac{3}{1-x}$ in interval notation is:

Answer: $(-\infty, -2) \cup (1, 2)$

24) The solution set in interval notation of the inequality $\frac{5}{x} \leq \frac{-5}{3x+2}$ is:

Answer: $\left(-\infty, -\frac{2}{3}\right) \cup \left[-\frac{1}{2}, 0\right)$

25) If the solution set, in interval notation, of the inequality

$$1 > \frac{5+3x}{-2} > -10, \quad \text{is } (p, q), \quad \text{then } p+q =$$

A) $\frac{8}{3}$

26) The **solution set**, in interval notation, of the inequality $x - 1 \leq \frac{12}{x}$ is

A) $(-\infty, -3] \cup (0, 4]$

B) $(-\infty, -4] \cup (0, 3]$

C) $[-3, 0) \cup [4, \infty)$

D) $[-4, 0) \cup [3, \infty)$

E) $[-3, 4]$