CHAPTER 1.7

Solving Inequalities

Multiple-Choice Old Exam Questions

27 questions • 5 topics • options A–E • two questions per page

Topic 1 | Linear and Compound Inequalities

Double inequalities and inequalities joined by "and" • Questions 1–4

Q **1**

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) $\left[\frac{13}{6}, \frac{11}{5}\right]$

Q **2**

The solution set of the inequality $-\frac{3}{2} \leq \frac{2-x}{6} \leq \frac{5}{3}$ is

A) $[11, \infty)$

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

C) $[-8, 11]$

D) $[-11, 8]$

E) $(-\infty, -8] \cup [11, \infty)$

Q
3

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

A) $[2, \infty)$

B) $\left(-\frac{5}{3}, \infty\right)$

C) $(2, \infty)$

D) $\left(-\frac{5}{3}, 2\right]$

E) $(-\infty, 2]$

Q
4

If the solution set, in interval notation, of the inequality $1 > \frac{5+3x}{-2} > -10$ is (p, q), then $p + q =$

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

B) $-\frac{8}{3}$

C) $\frac{22}{3}$

D) 2

E) 5

Topic 2 | Polynomial and Factored Inequalities

Factoring, sign charts, and expressions with repeated factors • Questions 5–8

Q 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) $(3, 4) \cup (4, \infty)$

Q 6

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) $(-\infty, -1]$

Q
7

The solution set of the inequality $x^2 - 2x + 1 \leq 0$ is

A) $\{1\}$

B) $\emptyset$

C) $(-\infty, \infty)$

D) $(-\infty, 1)$

E) $(-\infty, 1) \cup (1, \infty)$

Q
8

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) $[-1, 2] \cup [3, 4)$

Topic 3 | Quadratic Equations with a Parameter

Using the discriminant to find the values of k that give real or nonreal solutions • Questions 9–12

Q **9**

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) $(-4, \infty)$

Q **10**

The values of k, in interval notation, for which the equation $x^2 + kx + 3k = 5$ has NO real solution are

A) $(2, 10)$

B) $(0, 2)$

C) $(0, 12)$

D) $(-\infty, 2) \cup (10, \infty)$

E) $(-\infty, 0) \cup (12, \infty)$

Q
11

The set of all real values of k, in interval notation, for which the quadratic equation $x^2 - 4x + k = 1$ has two distinct real solutions is

A) $(-\infty, 5)$

B) $(-\infty, -5)$

C) $(3, \infty)$

D) $(-\infty, 3)$

E) $(5, \infty)$

Q
12

If the quadratic equation $2x^2 + kx + k - \frac{3}{2} = 0$ has two nonreal complex roots, then

A) $2 < k < 6$

B) $k < 2$ or $k > 6$

C) $-6 < k < -2$

D) $k < 6$

E) $k > 2$

Topic 4 | Rational Inequalities: Basic

Rewriting with a common denominator and testing the sign on each interval • Questions 13–18

Q **13**

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) $(-\infty, -5) \cup (-3, \infty)$

Q **14**

The solution set, in interval notation, of 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) $(5, \infty)$

Q
15

The solution set of the inequality $\frac{2x-3}{x+1} \geq 1$ is

A) $(-\infty, -4)$

B) $(-\infty, -1) \cup [4, \infty)$

C) $[-1, 4]$

D) $(-1, 4]$

E) $(-\infty, -1] \cup [4, \infty)$

Q
16

The solution set of the inequality $x + \frac{1}{x} \geq 0$ is

A) $(0, \infty)$

B) $[0, \infty)$

C) $[-1, 1]$

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

E) $[-1, 0) \cup [1, \infty)$

Q
17

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

Q
18

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

Topic 5 | Rational Inequalities: Advanced

Several factors, unlike denominators, and solution sets with excluded points • Questions 19–27

Q **19**

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) $\left(-\infty, \frac{3}{2}\right) \cup [6, \infty)$

E) $\left(-6, \frac{3}{2}\right] \cup [6, \infty)$

Q **20**

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

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

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

C) $[-1, 0) \cup [9, \infty)$

D) $(-\infty, -1) \cup (0, 9)$

E) $[-1, 9]$

Q
21

The solution set, in interval notation, of the inequality $\frac{-x^2+x+6}{(x+1)(x^2+1)} \leq 0$ is

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

B) $(-2, -1) \cup (3, \infty)$

C) $(-\infty, -2] \cup (-1, 3]$

D) $[-2, 3]$

E) $(-1, 3]$

Q
22

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

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

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

C) $(1, 2) \cup \left[\frac{8}{3}, \infty\right)$

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

E) $\left(1, \frac{8}{3}\right]$

Q
23

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

A) $[-1, 0) \cup [3, \infty)$

B) $(-\infty, -1] \cup (0, 3]$

C) $[-1, 3]$

D) $(-1, 0) \cup (3, \infty)$

E) $[-1, 0) \cup (3, \infty)$

Q
24

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

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

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

C) $\left(-\infty, -\frac{7}{2}\right] \cup \left[\frac{11}{9}, \frac{8}{3}\right)$

D) $\left(-\infty, -\frac{7}{2}\right) \cup \left(\frac{8}{3}, \infty\right)$

E) $\left(-\frac{7}{2}, \frac{8}{3}\right)$

Q
25

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

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

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

C) $(-\infty, -2) \cup (1, 2)$

D) $(-2, 1) \cup (2, \infty)$

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

Q
26

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

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

B) $\left(-\frac{2}{3}, -\frac{1}{2}\right] \cup (0, \infty)$

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

D) $\left(-\infty, -\frac{1}{2}\right] \cup (0, \infty)$

E) $\left(-\frac{2}{3}, 0\right)$

Q
27

The solution set, in interval notation, of the inequality $\frac{x^2-4x+4}{x^2-9} \geq 0$ is

A) $(-\infty, -3) \cup (3, \infty) \cup \{2\}$

B) $(-\infty, -3) \cup (3, \infty)$

C) $(-3, 3)$

D) $(-3, 3) \cup \{2\}$

E) $(-\infty, -3] \cup [3, \infty) \cup \{2\}$

Answer Key

"Original" shows the question number in the source worksheet.

Q	Original	Ans.	Value	Q	Original	Ans.	Value
1	3	**A**	$\left[\frac{11}{12}, \frac{13}{6}\right]$	**15**	21	**B**	$(-\infty, -1) \cup [4, \infty)$
2	20	**C**	$[-8, 11]$	**16**	26	**A**	$(0, \infty)$
3	12	**A**	$[2, \infty)$	**17**	2	**A**	$[-2, 0) \cup [2, \infty)$
4	18	**A**	$\frac{8}{3}$	**18**	19	**A**	$(-\infty, -3] \cup (0, 4]$
5	5	**A**	$[-4, -3] \cup [3, \infty)$	**19**	6	**A**	$(-\infty, -6) \cup [-3, 6)$
6	7	**A**	$[-1, \infty) \cup \{-5\}$	**20**	10	**A**	$(-\infty, -1] \cup (0, 9]$
7	27	**A**	$\{1\}$	**21**	11	**A**	$[-2, -1) \cup [3, \infty)$
8	9	**A**	$(-\infty, 2] \cup \{3\} \cup (4, \infty)$	**22**	13	**A**	$(-\infty, 1) \cup \left(2, \frac{8}{3}\right]$
9	8	**A**	$(-4, 2)$	**23**	14	**A**	$[-1, 0) \cup [3, \infty)$
10	22	**A**	$(2, 10)$	**24**	15	**A**	$\left(-\infty, -\frac{7}{2}\right) \cup \left(\frac{11}{9}, \frac{8}{3}\right)$
11	23	**A**	$(-\infty, 5)$	**25**	16	**A**	$(-\infty, -2] \cup (1, 2)$
12	24	**A**	$2 < k < 6$	**26**	17	**A**	$\left(-\infty, -\frac{2}{3}\right) \cup \left[-\frac{1}{2}, 0\right)$
13	1	**A**	$(3, 5)$	**27**	25	**A**	$(-\infty, -3) \cup (3, \infty) \cup \{2\}$
14	4	**A**	$(-\infty, 2) \cup (5, \infty)$				