

**Gateway Exam #1 Practice Problems**  
**Working with Inequalities**

1. The numerical values denoted by the inequality  $-1 < x < 4$  consist of:
  - (a) all values of  $x$  between  $x = -1$  and  $x = 4$ , including  $x = -1$  but not  $x = 4$
  - (b) all values of  $x$  between  $x = -1$  and  $x = 4$ , including  $x = 4$  but not  $x = -1$
  - (c) all values of  $x$  between  $x = -1$  and  $x = 4$ , including neither  $x = -1$  nor  $x = 4$
  - (d) all values of  $x$  between  $x = -1$  and  $x = 4$ , including both  $x = -1$  and  $x = 4$
  - (e) all values of  $x$  that are less than  $x = -1$  and all values of  $x$  that are greater than  $x = 4$
  
2. The numerical values denoted by the inequality  $2 \leq x < 5$  consist of:
  - (a) all values of  $x$  between  $x = 2$  and  $x = 5$ , including both  $x = 2$  and  $x = 5$
  - (b) all values of  $x$  between  $x = 2$  and  $x = 5$ , including neither  $x = 2$  nor  $x = 5$
  - (c) all values of  $x$  between  $x = 2$  and  $x = 5$ , including  $x = 2$  but not  $x = 5$
  - (d) all values of  $x$  between  $x = 2$  and  $x = 5$ , including  $x = 5$  but not  $x = 2$
  - (e) all values of  $x$  that are less than or equal to  $x = 2$  and all values of  $x$  that are greater than  $x = 5$ , but not including  $x = 5$
  
3. The numerical values denoted by the inequality  $1 < x \leq 2$  consist of:
  - (a) all values of  $x$  between  $x = 1$  and  $x = 2$ , including  $x = 1$  but not  $x = 2$
  - (b) all values of  $x$  between  $x = 1$  and  $x = 2$ , including  $x = 2$  but not  $x = 1$
  - (c) all values of  $x$  between  $x = 1$  and  $x = 2$ , including neither  $x = 1$  nor  $x = 2$
  - (d) all values of  $x$  between  $x = 1$  and  $x = 2$ , including both  $x = 1$  and  $x = 2$
  - (e) all values of  $x$  that are less than  $x = 1$  and all values of  $x$  that are greater than, but not equal to,  $x = 2$
  
4. The values of  $x$  that satisfy the inequality  $1 + x > 2$  are:
  - (a) all values of  $x$  between  $x = 1$  and  $x = 2$ , including neither  $x = 1$  nor  $x = 2$
  - (b) all values of  $x$  greater than  $x = 1$ , including  $x = 1$
  - (c) all values of  $x$  less than  $x = 1$ , not including  $x = 1$
  - (d) all values of  $x$  less than  $x = 1$ , including  $x = 1$
  - (e) all values of  $x$  greater than  $x = 1$ , not including  $x = 1$
  
5. The values of  $x$  that satisfy the inequality  $2x < 3 + x$  are:
  - (a) all values of  $x$  less than  $x = 3$ , not including  $x = 3$
  - (b) all values of  $x$  between  $x = 2$  and  $x = 3$ , including neither  $x = 2$  nor  $x = 3$
  - (c) all values of  $x$  between  $x = 2$  and  $x = 3$ , including  $x = 2$  but not  $x = 3$
  - (d) all values of  $x$  between  $x = 2$  and  $x = 3$ , including  $x = 3$  but not  $x = 2$

(e) all values of  $x$  greater than  $x = 2$ , not including  $x = 2$

6. The values of  $x$  that satisfy the inequality  $x > 4 - x$  are:

- (a) all values of  $x$  greater than  $x = 2$ , not including  $x = 2$
- (b) all values of  $x$  between  $x = 1$  and  $x = 4$ , including neither  $x = 1$  nor  $x = 4$
- (c) all values of  $x$  between  $x = 1$  and  $x = 4$ , including both  $x = 1$  and  $x = 4$
- (d) all values of  $x$  between  $x = 1$  and  $x = 4$ , including  $x = 1$  but not  $x = 4$
- (e) all values of  $x$  between  $x = 1$  and  $x = 4$ , including  $x = 4$  but not  $x = 1$

7. The values of  $x$  that satisfy the inequality  $2x < 16 + x$  are:

- (a) all values of  $x$  between  $x = 8$  and  $x = 16$ , including neither  $x = 8$  nor  $x = 16$
- (b) all values of  $x$  less than  $x = 16$ , not including  $x = 16$
- (c) all values of  $x$  less than  $x = 8$ , not including  $x = 8$
- (d) all values of  $x$  less than  $x = 16$ , including  $x = 16$
- (e) all values of  $x$  less than  $x = 8$  including  $x = 8$

8. The values of  $x$  that satisfy the inequality  $x^2 < 1$  are:

- (a) all values of  $x$  less than  $x = 1$ , not including  $x = 1$
- (b) all values of  $x$  between  $x = -1$  and  $x = 1$ , including neither  $x = -1$  nor  $x = 1$
- (c) all values of  $x$  less than  $x = -1$ , not including  $x = -1$
- (d) all values of  $x$  less than  $x = -1$  and all values of  $x$  greater than  $x = 1$ , including neither  $x = -1$  nor  $x = 1$
- (e) all possible values of  $x$

9. The values of  $x$  that satisfy the inequality  $x^2 > 9$  are:

- (a) all values of  $x$  greater than  $x = -3$ , not including  $x = -3$
- (b) all values of  $x$  greater than  $x = 3$ , not including  $x = 3$
- (c) all values of  $x$  less than  $x = -3$  and all values of  $x$  greater than  $x = 3$ , including neither  $x = -3$  nor  $x = 3$
- (d) all values of  $x$  between  $x = -3$  and  $x = 3$ , including neither  $x = -3$  nor  $x = 3$
- (e) all values of  $x$  less than  $x = 3$ , not including  $x = 3$

10. The values of  $x$  that satisfy the inequality  $x^2 < 4$  are:

- (a) all values of  $x$  less than  $x = 2$ , not including  $x = 2$
- (b) all values of  $x$  greater than  $x = 2$ , not including  $x = 2$
- (c) all values of  $x$  greater than  $x = -2$ , not including  $x = -2$
- (d) all values of  $x$  between  $x = -2$  and  $x = 2$ , including neither  $x = -2$  nor  $x = 2$
- (e) all values of  $x$  less than  $x = -2$ , not including  $x = -2$

11. The values of  $x$  that satisfy the inequality  $x^2 > 0$  are:
- all values of  $x$  greater than  $x = 0$ , not including  $x = 0$
  - all values of  $x$  less than  $x = 0$ , not including  $x = 0$
  - all values of  $x$  that are both less than and greater than  $x = 0$
  - $x = 0$  only
  - all values of  $x$  except for  $x = 0$
12. The values of  $x$  that satisfy the inequality  $\frac{1}{x^2} < \frac{1}{100}$  are:
- all values of  $x$  greater than  $x = 10$ , not including  $x = 10$
  - all values of  $x$  less than  $x = -10$ , not including  $x = -10$
  - all values of  $x$  between  $x = -10$  and  $x = 10$ , including neither  $x = -10$  nor  $x = 10$
  - all values of  $x$  less than  $x = -10$  and all values of  $x$  greater than  $x = 10$ , including neither  $x = -10$  nor  $x = 10$
  - all values of  $x$  between  $x = -10$  and  $x = 10$ , including both  $x = -10$  and  $x = 10$
13. The values of  $x$  that satisfy the inequality  $\frac{1}{x} > 3$  are:
- all values of  $x$  between  $x = 0$  and  $x = 3$ , including neither  $x = 0$  nor  $x = 3$
  - all values of  $x$  between  $x = -\frac{1}{3}$  and  $x = \frac{1}{3}$ , including neither  $x = -\frac{1}{3}$  nor  $x = \frac{1}{3}$
  - all values of  $x$  between  $x = 0$  and  $x = \frac{1}{3}$ , including neither  $x = 0$  nor  $x = \frac{1}{3}$
  - all values of  $x$  greater than  $x = \frac{1}{3}$ , not including  $x = \frac{1}{3}$
  - There are no values of  $x$  that satisfy the given inequality.
14. The values of  $x$  that satisfy the inequality  $4 < \frac{1}{x}$  are:
- all values of  $x$  greater than  $x = 4$ , not including  $x = 4$
  - all values of  $x$  between  $x = 0$  and  $x = \frac{1}{4}$ , including neither  $x = 0$  nor  $x = \frac{1}{4}$
  - all values of  $x$  between  $x = -\frac{1}{4}$  and  $x = \frac{1}{4}$ , including neither  $x = -\frac{1}{4}$  nor  $x = \frac{1}{4}$
  - all values of  $x$  less than  $x = -4$  and all values of  $x$  greater than  $x = 4$ , including neither  $x = -4$  nor  $x = 4$
  - There are no values of  $x$  that satisfy the given inequality.
15. The values of  $x$  that satisfy the inequality  $\frac{1}{x+1} < \frac{1}{2}$  are:
- all values of  $x$  greater than  $x = 1$ , not including  $x = 1$
  - all values of  $x$  greater than  $x = \frac{1}{2}$ , not including  $x = \frac{1}{2}$
  - all values of  $x$  between  $x = -1$  and  $x = 1$ , including neither  $x = -1$  nor  $x = 1$
  - all values of  $x$  less than  $x = -1$  and all values of  $x$  greater than  $x = 1$ , including neither  $x = -1$  nor  $x = 1$
  - There are no values of  $x$  that satisfy the given inequality.

**Answers:**

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|-------|-------|-------|-------|-------|
| 1. c  | 2. c  | 3. b  | 4. e  | 5. a  |
| 6. a  | 7. b  | 8. b  | 9. c  | 10. d |
| 11. e | 12. d | 13. c | 14. b | 15. a |