Linear inequalities: 10 practice questions

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Name: _____ Date: _____

Attempt all questions and show your working. Suggested time: 15 to 20 minutes.

Section A: Consolidating (Questions 1-4)

Question 1

State whether each statement is true or false.

(a) $5 > 3$

(b) $-2 < -7$

(c) $4 \leq 4$

(d) $-1 \geq 0$

Question 2

Solve each inequality.

(a) $x + 7 > 12$

(b) $3x \leq 18$

(c) $x - 4 < -1$

Question 3

Write the inequality shown by each number line description.

(a) A closed (filled in) circle at 2, with an arrow pointing to the right.

(b) An open (hollow) circle at -3, with an arrow pointing to the left.

Question 4

(a) Is $x = 4$ a solution of $2x + 1 > 8$? Show how you know.

(b) Is $x = 3$ a solution of $2x + 1 > 8$? Show how you know.

Section B: Standard (Questions 5-10)

Question 5

Solve each inequality.

(a) $2x + 5 \geq 17$

(b) $4x - 3 < 13$

(c) $x/3 + 2 > 5$

Question 6

Solve each inequality, then graph the solution on a number line.

(a) $5x - 2 \leq 3x + 8$

(b) $7 + 2x > 4x - 5$

Question 7

Solve each inequality. Take care when multiplying or dividing by a negative number.

(a) $-3x > 12$

(b) $5 - 2x \leq 11$

(c) $-x/4 \geq 2$

Question 8

Solve each inequality.

(a) $3(x - 2) < 15$

(b) $2(3x + 1) \geq 4(x + 3)$

(c) $5 - (x + 1) > 2x$

Question 9

Solve each inequality.

(a) $(x + 4)/(2) \leq 6$

(b) $(2x - 1)/(3) > x - 2$

(c) $x/2 - x/3 \geq 1$

Question 10

Sam solved $-2x < 10$ by dividing both sides by -2 and wrote the answer $x < -5$.

(a) Test $x = 0$ in the original inequality and in Sam's answer. What does this show?

(b) Explain Sam's mistake and write the correct solution.

Linear inequalities: answers

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Question 1

Answer: (a) true (b) false (c) true (d) false

Question 2

Answer: (a) $x > 5$ (b) $x \leq 6$ (c) $x < 3$

Question 3

Answer: (a) $x \geq 2$ (b) $x < -3$

Question 4

Answer: (a) Yes: $2(4) + 1 = 9$ and $9 > 8$ (b) No: $2(3) + 1 = 7$ and 7 is not greater than 8

Question 5

Answer: (a) $x \geq 6$ (b) $x < 4$ (c) $x > 9$

Question 6

Answer: (a) $x \leq 5$, closed circle at 5 with an arrow to the left (b) $x < 6$, open circle at 6 with an arrow to the left ($12 > 2x$)

Question 7

Answer: (a) $x < -4$ (b) $x \geq -3$ (c) $x \leq -8$

Question 8

Answer: (a) $x < 7$ (b) $x \geq 5$ (c) $x < 4/3$ (also accept $x < 1⅓$)

Question 9

Answer: (a) $x \leq 8$ (b) $x < 5$ (also accept $5 > x$) (c) $x \geq 6$ ($x/6 \geq 1$)

Question 10

Answer: (a) $x = 0$ makes $-2x < 10$ true ($0 < 10$) but does not satisfy $x < -5$, so Sam's answer is wrong (b) When dividing (or multiplying) both sides by a negative number the inequality sign must be reversed, so $x > -5$