

Double Inequalities and Integer Solutions

ANSWERS

1 Solve $-7 < 2x - 1 \leq 5$

+ 1 to all three parts $-6 < 2x \leq 6$

÷ 2 all three parts $-3 < x \leq 3$

Answer $-3 < x \leq 3$

Check: try a value from your answer in the question. Is it true?

$x = 0: -7 < -1 \leq 5$ is true

2 Solve $2 \leq 3x + 8 < 23$

- 8 from all three parts $-6 \leq 3x < 15$

÷ 3 all three parts $-2 \leq x < 5$

Answer $-2 \leq x < 5$

Check: try a value from your answer in the question. Is it true?

$x = 0: 2 \leq 8 < 23$ is true

3 Solve $-9 < 4x - 1 < 11$

+ 1 to all three parts $-8 < 4x < 12$

÷ 4 all three parts $-2 < x < 3$

Answer $-2 < x < 3$

Check: try a value from your answer in the question. Is it true?

$x = 0: -9 < -1 < 11$ is true

4 Solve $5 \leq 5x + 10 \leq 30$

- 10 from all three parts $-5 \leq 5x \leq 20$

÷ 5 all three parts $-1 \leq x \leq 4$

Answer $-1 \leq x \leq 4$

Check: try a value from your answer in the question. Is it true?

$x = 0: 5 \leq 10 \leq 30$ is true

5 Solve $-8 \leq 2x - 4 < 3$ and list the integers that satisfy it.

+ 4 to all three parts $-4 \leq 2x < 7$

÷ 2 all three parts $-2 \leq x < 3.5$

Answer $-2 \leq x < 3.5$

Integers $-2, -1, 0, 1, 2, 3$

Check $x = 0: -8 \leq -4 < 3$ is true

6 How many integers satisfy $-13 < 3x - 1 < 8$?

+ 1 to all three parts $-12 < 3x < 9$

÷ 3 all three parts $-4 < x < 3$

Answer $-4 < x < 3$

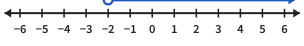
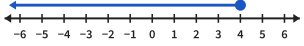
How many? 6

Check $x = 0: -13 < -1 < 8$ is true

7 n is an integer. $2n + 5 > 1$ and $3n - 4 \leq 8$. Find all the values of n .

$2n + 5 > 1$
 $2n > -4, n > -2$

$3n - 4 \leq 8$
 $3n \leq 12, n \leq 4$

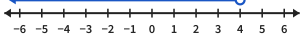
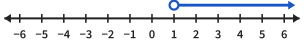



n = $-1, 0, 1, 2, 3, 4$

8 n is an integer. $4n - 1 < 15$ and $3 - n < 2$. Find all the values of n .

$4n - 1 < 15$
 $4n < 16, n < 4$

$3 - n < 2$
 $-n < -1, n > 1$ (turn the sign round)

n = $2, 3$

Double Inequalities and Integer Solutions further practice

ANSWERS

9 Solve $-3 < 2x + 1 \leq 7$ and list the integers that satisfy it.

$-4 < 2x \leq 6$
 $-2 < x \leq 3$

Answer $-2 < x \leq 3; -1, 0, 1, 2, 3$

10 Solve $2 < \frac{x+4}{3} \leq 5$.

$6 < x + 4 \leq 15$ ($\times 3$ all three parts)
 $2 < x \leq 11$ ($- 4$ from all three parts)

Answer $2 < x \leq 11$

11 Solve $-3 \leq 7 - 2x < 9$.

$-10 \leq -2x < 2$ ($- 7$ from all three parts)
 $5 \geq x > -1$ ($\div -2$ all three parts, turn both signs round)

Answer $-1 < x \leq 5$

12 A fence is made of panels 6 m long and one gate 4 m wide. The fence must be longer than 30 m and at most 52 m. How many panels could it have?

$30 < 6p + 4 \leq 52$, so $26 < 6p \leq 48$
 $4.3... < p \leq 8$

Answer $5, 6, 7$ or 8 panels

13 A length is 12 cm to the nearest cm. The length is $(2x + 4)$ cm. Find the error interval for x .

$11.5 \leq 2x + 4 < 12.5$
 $7.5 \leq 2x < 8.5$

Answer $3.75 \leq x < 4.25$

14 n is an integer. $3n + 1 \geq n - 5$ and $2n - 7 < 4$. How many possible values of n are there?

$n \geq -3$ and $n < 5.5$
 -3 to 5

Answer 9

15 Sam solves $-4 < 2x + 6 \leq 10$ and gets $-10 < x \leq 4$. Explain his mistake. Write the right answer.

He took 6 from all three parts but divided only the middle by 2.

Answer $-5 < x \leq 2$

16 Explain why no integer satisfies $9 < 4x + 1 < 13$.

$8 < 4x < 12$
 No integer is between 2 and 3.

Answer $2 < x < 3$