

This key should allow you to understand why you choose the option you did (beyond just getting a question right or wrong). More instructions on how to use this key can be found [here](#).

If you have a suggestion to make the keys better, please fill out the short survey [here](#).

*Note: This key is auto-generated and may contain issues and/or errors. The keys are reviewed after each exam to ensure grading is done accurately. If there are issues (like duplicate options), they are noted in the offline gradebook. The keys are a work-in-progress to give students as many resources to improve as possible.*

11. Solve the linear inequality below. Then, choose the constant and interval combination that describes the solution set.

$$3x - 3 > 4x + 4$$

The solution is  $(-\infty, -7.0)$

A.  $(a, \infty)$ , where  $a \in [-10, 1]$

$(-7.0, \infty)$ , which corresponds to switching the direction of the interval. You likely did this if you did not flip the inequality when dividing by a negative!

B.  $(-\infty, a)$ , where  $a \in [6, 8]$

$(-\infty, 7.0)$ , which corresponds to negating the endpoint of the solution.

C.  $(-\infty, a)$ , where  $a \in [-8, -1]$

\*  $(-\infty, -7.0)$ , which is the correct option.

D.  $(a, \infty)$ , where  $a \in [6, 8]$

$(7.0, \infty)$ , which corresponds to switching the direction of the interval AND negating the endpoint. You likely did this if you did not flip the inequality when dividing by a negative as well as not moving values over to a side properly.

E. None of the above.

You may have chosen this if you thought the inequality did not match the ends of the intervals.

General Comments: Remember that less/greater than or equal to includes the endpoint, while less/greater do not. Also, remember that you need to flip the inequality when you multiply or divide by a negative.

12. Solve the linear inequality below. Then, choose the constant and interval combination that describes the solution set.

$$-8 + 4x > 6x \text{ or } -3 + 8x < 11x$$

The solution is  $(-\infty, -4.0)$  or  $(-1.0, \infty)$

A.  $(-\infty, a] \cup [b, \infty)$ , where  $a \in [0, 6]$  and  $b \in [2, 5]$

Corresponds to including the endpoints AND negating.

B.  $(-\infty, a] \cup [b, \infty)$ , where  $a \in [-8, -3]$  and  $b \in [-5, 2]$

Corresponds to including the endpoints (when they should be excluded).

C.  $(-\infty, a) \cup (b, \infty)$ , where  $a \in [-9, -1]$  and  $b \in [-3, 3]$

\* Correct option.

D.  $(-\infty, a) \cup (b, \infty)$ , where  $a \in [-2, 2]$  and  $b \in [0, 5]$

Corresponds to inverting the inequality and negating the solution.

E.  $(-\infty, \infty)$

Corresponds to the variable canceling, which does not happen in this instance.

General Comments: When multiplying or dividing by a negative, flip the sign.

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13. Solve the linear inequality below. Then, choose the constant and interval combination that describes the solution set.

$$\frac{9}{2} + \frac{4}{7}x < \frac{5}{4}x - \frac{10}{5}$$

The solution is  $(9.579, \infty)$

A.  $(-\infty, a)$ , where  $a \in [-14, -8]$

$(-\infty, -9.579)$ , which corresponds to switching the direction of the interval AND negating the endpoint. You likely did this if you did not flip the inequality when dividing by a negative as well as not moving values over to a side properly.

B.  $(-\infty, a)$ , where  $a \in [6, 11]$

$(-\infty, 9.579)$ , which corresponds to switching the direction of the interval. You likely did this if you did not flip the inequality when dividing by a negative!

C.  $(a, \infty)$ , where  $a \in [7, 14]$

\*  $(9.579, \infty)$ , which is the correct option.

D.  $(a, \infty)$ , where  $a \in [-13, -7]$

$(-9.579, \infty)$ , which corresponds to negating the endpoint of the solution.

E. None of the above.

You may have chosen this if you thought the inequality did not match the ends of the intervals.

General Comments: Remember that less/greater than or equal to includes the endpoint, while less/greater do not. Also, remember that you need to flip the inequality when you multiply or divide by a negative.

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14. Solve the linear inequality below. Then, choose the constant and interval combination that describes the solution set.

$$-3 + 8x < \frac{76x + 4}{9} \leq -5 + 7x$$

The solution is  $(-7.75, -3.77]$

A.  $[a, b)$ , where  $a \in [-12, -3]$  and  $b \in [-7, 2]$

$[-7.75, -3.77]$ , which corresponds to flipping the inequality.

B.  $(-\infty, a) \cup [b, \infty)$ , where  $a \in [-12, -6]$  and  $b \in [-5, 0]$

$(-\infty, -7.75) \cup [-3.77, \infty)$ , which corresponds to displaying the and-inequality as an or-inequality.

C.  $(a, b]$ , where  $a \in [-9, -6]$  and  $b \in [-6, 0]$

\*  $(-7.75, -3.77]$ , which is the correct option.

D.  $(-\infty, a] \cup (b, \infty)$ , where  $a \in [-12, -2]$  and  $b \in [-10, -3]$

$(-\infty, -7.75] \cup (-3.77, \infty)$ , which corresponds to displaying the and-inequality as an or-inequality AND flipping the inequality.

E. None of the above.

To solve, you will need to break up the compound inequality into two inequalities. Be sure to keep track of the inequality! It may be best to draw a number line and graph your solution.

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15. Using an interval or intervals, describe all the  $x$ -values within or including a distance of the given values.

More than 8 units from the number 7.

The solution is None of the above

A.  $(1, 15)$

This describes the values less than 7 from 8

B.  $[1, 15]$

This describes the values no more than 7 from 8

C.  $(-\infty, 1) \cup (15, \infty)$

This describes the values more than 7 from 8

D.  $(-\infty, 1] \cup [15, \infty)$

This describes the values no less than 7 from 8

E. None of the above

Options A-D described the values [more/less than] 7 units from 8, which is the reverse of what the question asked.

General Comments: When thinking about this language, it helps to draw a number line and try points.

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