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.

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

$$-5 + 3x > 5x \text{ or } 7 + 6x < 8x$$

The solution is $(-\infty, -2.5)$ or $(3.5, \infty)$, which is option B.

A. $(-\infty, a] \cup [b, \infty)$, where $a \in [-2.56, -2.25]$ and $b \in [3.39, 3.77]$

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

B. $(-\infty, a) \cup (b, \infty)$, where $a \in [-2.9, -1.8]$ and $b \in [2.63, 4.43]$

* Correct option.

C. $(-\infty, a] \cup [b, \infty)$, where $a \in [-3.75, -3.25]$ and $b \in [2.41, 2.71]$

Corresponds to including the endpoints AND negating.

D. $(-\infty, a) \cup (b, \infty)$, where $a \in [-5.1, -3.1]$ and $b \in [2.37, 3.21]$

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

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

$$\frac{-9}{2} - \frac{9}{7}x \geq \frac{7}{9}x + \frac{5}{5}$$

The solution is $(-\infty, -2.665]$, which is option A.

A. $(-\infty, a]$, where $a \in [-3.67, 0.33]$

* $(-\infty, -2.665]$, which is the correct option.

B. $(-\infty, a]$, where $a \in [-0.33, 3.67]$

$(-\infty, 2.665]$, which corresponds to negating the endpoint of the solution.

C. $[a, \infty)$, where $a \in [-6.67, 1.33]$

$[-2.665, \infty)$, 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!

D. $[a, \infty)$, where $a \in [1.67, 7.67]$

$[2.665, \infty)$, 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 Comment: 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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3. Solve the linear inequality below. Then, choose the constant and interval combination that describes the solution set.

$$-9 - 4x < \frac{-30x - 6}{8} \leq -3 - 5x$$

The solution is $(-33.00, -1.80]$, which is option B.

A. $(-\infty, a) \cup [b, \infty)$, where $a \in [-36, -30]$ and $b \in [-1.8, 0.2]$

$(-\infty, -33.00) \cup [-1.80, \infty)$, which corresponds to displaying the and-inequality as an or-inequality.

B. $(a, b]$, where $a \in [-36, -30]$ and $b \in [-4.8, 0.2]$

* $(-33.00, -1.80]$, which is the correct option.

C. $[a, b)$, where $a \in [-37, -32]$ and $b \in [-5.8, 1.2]$

$[-33.00, -1.80)$, which corresponds to flipping the inequality.

D. $(-\infty, a] \cup (b, \infty)$, where $a \in [-36, -29]$ and $b \in [-1.8, 1.2]$

$(-\infty, -33.00] \cup (-1.80, \infty)$, which corresponds to displaying the and-inequality as an or-inequality AND flipping the inequality.

E. None of the above.

General Comment: 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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4. Solve the linear inequality below. Then, choose the constant and interval combination that describes the solution set.

$$8x - 7 < 10x + 10$$

The solution is $(-8.5, \infty)$, which is option D.

A. $(-\infty, a)$, where $a \in [5.5, 10.5]$

$(-\infty, 8.5)$, 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 $a \in [-15.5, -3.5]$

$(-\infty, -8.5)$, 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, ∞), where $a \in [5.5, 12.5]$

$(8.5, \infty)$, which corresponds to negating the endpoint of the solution.

D. (a, ∞), where $a \in [-10.5, -2.5]$

* $(-8.5, \infty)$, which is the correct option.

E. None of the above.

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

General Comment: 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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5. Using an interval or intervals, describe all the x-values within or including a distance of the given values.

No more than 4 units from the number 9.

The solution is $[5, 13]$, which is option A.

A. $[5, 13]$

This describes the values no more than 4 from 9

B. $(-\infty, 5] \cup [13, \infty)$

This describes the values no less than 4 from 9

C. $(-\infty, 5) \cup (13, \infty)$

This describes the values more than 4 from 9

D. $(5, 13)$

This describes the values less than 4 from 9

E. None of the above

You likely thought the values in the interval were not correct.

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

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

$$-10x - 4 > -6x - 7$$

The solution is $(-\infty, 0.75)$, which is option C.

A. (a, ∞), where $a \in [-0.96, -0.47]$

$(-0.75, \infty)$, 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.

B. $(-\infty, a)$, where $a \in [-4.6, 0.1]$

$(-\infty, -0.75)$, which corresponds to negating the endpoint of the solution.

C. $(-\infty, a)$, where $a \in [0.6, 3.1]$

* $(-\infty, 0.75)$, which is the correct option.

D. (a, ∞), where $a \in [0.62, 0.86]$

$(0.75, \infty)$, 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!

E. None of the above.

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

General Comment: 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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7. Solve the linear inequality below. Then, choose the constant and interval combination that describes the solution set.

$$-7 - 8x < \frac{-22x - 5}{3} \leq -5 - 8x$$

The solution is $(-8.00, -5.00]$, which is option A.

A. $(a, b]$, where $a \in [-8, -3]$ and $b \in [-7, 0]$

  * $(-8.00, -5.00]$, which is the correct option.

B. $[a, b)$, where $a \in [-11, -3]$ and $b \in [-7, -1]$

  $[-8.00, -5.00)$, which corresponds to flipping the inequality.

C. $(-\infty, a) \cup [b, \infty)$, where $a \in [-13, -3]$ and $b \in [-6, -2]$

  $(-\infty, -8.00) \cup [-5.00, \infty)$, which corresponds to displaying the and-inequality as an or-inequality.

D. $(-\infty, a] \cup (b, \infty)$, where $a \in [-9, -7]$ and $b \in [-7, -1]$

  $(-\infty, -8.00] \cup (-5.00, \infty)$, which corresponds to displaying the and-inequality as an or-inequality AND flipping the inequality.

E. None of the above.

General Comment: 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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8. Solve the linear inequality below. Then, choose the constant and interval combination that describes the solution set.

$$3 + 6x > 9x \text{ or } 6 + 6x < 8x$$

The solution is $(-\infty, 1.0)$ or $(3.0, \infty)$, which is option A.

A. $(-\infty, a) \cup (b, \infty)$, where $a \in [1, 2]$ and $b \in [1, 6]$

  * Correct option.

B. $(-\infty, a] \cup [b, \infty)$, where $a \in [0, 4]$ and $b \in [3, 4]$

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

C. $(-\infty, a) \cup (b, \infty)$, where $a \in [-4, -2]$ and $b \in [-1, 0]$

  Corresponds to inverting the inequality and negating the solution.

D. $(-\infty, a] \cup [b, \infty)$, where $a \in [-3, 0]$ and $b \in [-4, 2]$

  Corresponds to including the endpoints AND negating.

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

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

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

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

$$\frac{10}{9} + \frac{5}{3}x \leq \frac{10}{5}x - \frac{3}{7}$$

The solution is $[4.619, \infty)$, which is option B.

A. $[a, \infty)$, where $a \in [-4.62, -2.62]$

$[-4.619, \infty)$, which corresponds to negating the endpoint of the solution.

B. $[a, \infty)$, where $a \in [2.62, 7.62]$

* $[4.619, \infty)$, which is the correct option.

C. $(-\infty, a]$, where $a \in [-7.62, -3.62]$

$(-\infty, -4.619]$, 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.

D. $(-\infty, a]$, where $a \in [3.62, 5.62]$

$(-\infty, 4.619]$, 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!

E. None of the above.

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

General Comment: 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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10. Using an interval or intervals, describe all the x-values within or including a distance of the given values.

No more than 9 units from the number 5.

The solution is $[-4, 14]$, which is option B.

A. $(-\infty, -4] \cup [14, \infty)$

This describes the values no less than 9 from 5

B. $[-4, 14]$

This describes the values no more than 9 from 5

C. $(-\infty, -4) \cup (14, \infty)$

This describes the values more than 9 from 5

D. $(-4, 14)$

This describes the values less than 9 from 5

E. None of the above

You likely thought the values in the interval were not correct.

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