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.

$$-10x - 3 < 8x + 5$$

The solution is $(-0.444, \infty)$, which is option B.

A. (a, ∞), where $a \in [-0.12, 1.06]$

$(0.444, \infty)$, which corresponds to negating the endpoint of the solution.

B. (a, ∞), where $a \in [-0.47, 0.28]$

* $(-0.444, \infty)$, which is the correct option.

C. $(-\infty, a)$, where $a \in [0.16, 1.2]$

$(-\infty, 0.444)$, 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 $a \in [-0.5, -0.11]$

$(-\infty, -0.444)$, 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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2. Using an interval or intervals, describe all the x-values within or including a distance of the given values.

$$\text{No more than 2 units from the number } -7.$$

The solution is $[-9, -5]$, which is option D.

A. $(-9, -5)$

This describes the values less than 2 from -7

B. $(-\infty, -9) \cup (-5, \infty)$

This describes the values more than 2 from -7

C. $(-\infty, -9] \cup [-5, \infty)$

This describes the values no less than 2 from -7

D. $[-9, -5]$

This describes the values no more than 2 from -7

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

$$-6 + 3x < \frac{38x + 3}{9} \leq 4 + 4x$$

The solution is None of the above., which is option E.

A. $[a, b)$, where $a \in [3.18, 6.18]$ and $b \in [-19.5, -15.5]$

$[5.18, -16.50)$, which corresponds to flipping the inequality and getting negatives of the actual endpoints.

B. $(-\infty, a) \cup [b, \infty)$, where $a \in [4.18, 8.18]$ and $b \in [-16.5, -12.5]$

$(-\infty, 5.18) \cup [-16.50, \infty)$, which corresponds to displaying the and-inequality as an or-inequality and getting negatives of the actual endpoints.

C. $(a, b]$, where $a \in [3.18, 7.18]$ and $b \in [-16.5, -8.5]$

$(5.18, -16.50]$, which is the correct interval but negatives of the actual endpoints.

D. $(-\infty, a] \cup (b, \infty)$, where $a \in [5.18, 11.18]$ and $b \in [-18.5, -14.5]$

$(-\infty, 5.18] \cup (-16.50, \infty)$, which corresponds to displaying the and-inequality as an or-inequality AND flipping the inequality AND getting negatives of the actual endpoints.

E. None of the above.

* This is correct as the answer should be $(-5.18, 16.50]$.

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.

$$\frac{-10}{2} - \frac{5}{8}x \geq \frac{10}{4}x - \frac{9}{6}$$

The solution is $(-\infty, -1.12]$, which is option C.

A. $(-\infty, a]$, where $a \in [1.12, 3.12]$

$(-\infty, 1.12]$, which corresponds to negating the endpoint of the solution.

B. $[a, \infty)$, where $a \in [-1.3, -0.4]$

$[-1.12, \infty)$, 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!

C. $(-\infty, a]$, where $a \in [-3.12, -0.12]$

* $(-\infty, -1.12]$, which is the correct option.

D. $[a, \infty)$, where $a \in [0.6, 1.9]$

$[1.12, \infty)$, 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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5. Solve the linear inequality below. Then, choose the constant and interval combination that describes the solution set.

$$-7 + 7x > 8x \text{ or } 4 + 9x < 10x$$

The solution is $(-\infty, -7.0)$ or $(4.0, \infty)$, which is option D.

A. $(-\infty, a] \cup [b, \infty)$, where $a \in [-4, -1]$ and $b \in [6, 10]$

Corresponds to including the endpoints AND negating.

B. $(-\infty, a) \cup (b, \infty)$, where $a \in [-6, 0]$ and $b \in [4.4, 9.1]$

Corresponds to inverting the inequality and negating the solution.

C. $(-\infty, a] \cup [b, \infty)$, where $a \in [-10, -5]$ and $b \in [4, 5]$

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

D. $(-\infty, a) \cup (b, \infty)$, where $a \in [-7, -6]$ and $b \in [2.5, 4.4]$

* Correct option.

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

$$-9 + 9x > 10x \text{ or } 5 + 8x < 10x$$

The solution is $(-\infty, -9.0)$ or $(2.5, \infty)$, which is option A.

A. $(-\infty, a) \cup (b, \infty)$, where $a \in [-15, -7]$ and $b \in [2.5, 3.5]$

* Correct option.

B. $(-\infty, a] \cup [b, \infty)$, where $a \in [-9, -8]$ and $b \in [2.5, 3.5]$

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

C. $(-\infty, a] \cup [b, \infty)$, where $a \in [-4.5, 0.5]$ and $b \in [7, 10]$

Corresponds to including the endpoints AND negating.

D. $(-\infty, a) \cup (b, \infty)$, where $a \in [-3.5, 0.5]$ and $b \in [8, 14]$

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

$$-6 + 6x \leq \frac{28x + 8}{4} < 5 + 6x$$

The solution is $[-8.00, 3.00)$, which is option C.

A. $(a, b]$, where $a \in [-8, -3]$ and $b \in [1, 7]$

$(-8.00, 3.00]$, which corresponds to flipping the inequality.

B. $(-\infty, a) \cup [b, \infty)$, where $a \in [-8, -6]$ and $b \in [2, 6]$

$(-\infty, -8.00) \cup [3.00, \infty)$, which corresponds to displaying the and-inequality as an or-inequality AND flipping the inequality.

C. $[a, b)$, where $a \in [-8, -7]$ and $b \in [-1, 7]$

$[-8.00, 3.00)$, which is the correct option.

D. $(-\infty, a] \cup (b, \infty)$, where $a \in [-11, -7]$ and $b \in [1, 4]$

$(-\infty, -8.00] \cup (3.00, \infty)$, which corresponds to displaying the and-inequality as an or-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. Using an interval or intervals, describe all the x-values within or including a distance of the given values.

More than 7 units from the number 10.

The solution is $(-\infty, 3) \cup (17, \infty)$, which is option A.

A. $(-\infty, 3) \cup (17, \infty)$

This describes the values more than 7 from 10

B. $(3, 17)$

This describes the values less than 7 from 10

C. $[3, 17]$

This describes the values no more than 7 from 10

D. $(-\infty, 3] \cup [17, \infty)$

This describes the values no less than 7 from 10

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

$$\frac{-8}{9} + \frac{4}{4}x \leq \frac{5}{8}x - \frac{10}{2}$$

The solution is $(-\infty, -10.963]$, which is option B.

A. $[a, \infty)$, where $a \in [8.96, 13.96]$

$[10.963, \infty)$, 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 $a \in [-13.96, -6.96]$

* $(-\infty, -10.963]$, which is the correct option.

C. $(-\infty, a]$, where $a \in [10.96, 11.96]$

$(-\infty, 10.963]$, which corresponds to negating the endpoint of the solution.

D. $[a, \infty)$, where $a \in [-11.96, -8.96]$

$[-10.963, \infty)$, 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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10. Solve the linear inequality below. Then, choose the constant and interval combination that describes the solution set.

$$-3x - 9 < 10x + 3$$

The solution is $(-0.923, \infty)$, which is option C.

A. (a, ∞), where $a \in [-0.2, 3.1]$

$(0.923, \infty)$, which corresponds to negating the endpoint of the solution.

B. $(-\infty, a)$, where $a \in [-2.5, 0]$

$(-\infty, -0.923)$, 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 $a \in [-2.3, 0.5]$

* $(-0.923, \infty)$, which is the correct option.

D. $(-\infty, a)$, where $a \in [0.8, 1.7]$

$(-\infty, 0.923)$, 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.