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.

$$-6 + 7x > 9x \text{ or } 9 + 9x < 11x$$

The solution is $(-\infty, -3.0)$ or $(4.5, \infty)$, which is option C.

A. $(-\infty, a] \cup [b, \infty)$, where $a \in [-3, -1]$ and $b \in [4, 8.5]$

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

B. $(-\infty, a) \cup (b, \infty)$, where $a \in [-8.5, -3.5]$ and $b \in [-5, 4]$

Corresponds to inverting the inequality and negating the solution.

C. $(-\infty, a) \cup (b, \infty)$, where $a \in [-4, -1]$ and $b \in [3.5, 6.5]$

* Correct option.

D. $(-\infty, a] \cup [b, \infty)$, where $a \in [-7.5, -3.5]$ and $b \in [1.5, 3.6]$

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

Less than 6 units from the number 9.

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

A. $(-\infty, -3) \cup (15, \infty)$

This describes the values more than 9 from 6

B. $(-\infty, -3] \cup [15, \infty)$

This describes the values no less than 9 from 6

C. $[-3, 15]$

This describes the values no more than 9 from 6

D. $(-3, 15)$

This describes the values less than 9 from 6

E. None of the above

Options A-D described the values [more/less than] 9 units from 6, which is the reverse of what the question asked.

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.

$$6x - 9 \geq 7x + 6$$

The solution is $(-\infty, -15.0]$, which is option B.

A. $[a, \infty)$, where $a \in [13, 16]$

$[15.0, \infty)$, 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.

B. $(-\infty, a]$, where $a \in [-21, -14]$

* $(-\infty, -15.0]$, which is the correct option.

C. $(-\infty, a]$, where $a \in [12, 17]$

$(-\infty, 15.0]$, which corresponds to negating the endpoint of the solution.

D. $[a, \infty)$, where $a \in [-15, -8]$

$[-15.0, \infty)$, 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!

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

No less than 3 units from the number 7.

The solution is $(-\infty, 4] \cup [10, \infty)$, which is option A.

A. $(-\infty, 4] \cup [10, \infty)$

This describes the values no less than 3 from 7

B. $(-\infty, 4) \cup (10, \infty)$

This describes the values more than 3 from 7

C. $[4, 10]$

This describes the values no more than 3 from 7

D. $(4, 10)$

This describes the values less than 3 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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5. Solve the linear inequality below. Then, choose the constant and interval combination that describes the solution set.

$$\frac{-4}{7} - \frac{6}{3}x < \frac{3}{4}x + \frac{8}{2}$$

The solution is $(-1.662, \infty)$, which is option D.

A. $(-\infty, a)$, where $a \in [-2.66, -0.66]$

$(-\infty, -1.662)$, 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 $a \in [-1.34, 3.66]$

$(-\infty, 1.662)$, 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.

C. (a, ∞), where $a \in [1.66, 2.66]$

$(1.662, \infty)$, which corresponds to negating the endpoint of the solution.

D. (a, ∞), where $a \in [-2.66, -0.66]$

* $(-1.662, \infty)$, 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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6. Solve the linear inequality below. Then, choose the constant and interval combination that describes the solution set.

$$-7 + 4x > 5x \text{ or } -8 + 6x < 9x$$

The solution is $(-\infty, -7.0)$ or $(-2.667, \infty)$, which is option D.

A. $(-\infty, a] \cup [b, \infty)$, where $a \in [-0.33, 8.67]$ and $b \in [4, 8]$

Corresponds to including the endpoints AND negating.

B. $(-\infty, a] \cup [b, \infty)$, where $a \in [-7, -2]$ and $b \in [-7.67, 0.33]$

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

C. $(-\infty, a) \cup (b, \infty)$, where $a \in [-0.33, 4.67]$ and $b \in [6, 9]$

Corresponds to inverting the inequality and negating the solution.

D. $(-\infty, a) \cup (b, \infty)$, where $a \in [-10, -6]$ and $b \in [-6.67, 2.33]$

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

$$\frac{7}{9} - \frac{4}{3}x \geq \frac{5}{5}x - \frac{8}{4}$$

The solution is $(-\infty, 1.19]$, which is option C.

A. $(-\infty, a]$, where $a \in [-1.19, -0.19]$

$(-\infty, -1.19]$, which corresponds to negating the endpoint of the solution.

B. $[a, \infty)$, where $a \in [-4.19, 0.81]$

$[-1.19, \infty)$, 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.

C. $(-\infty, a]$, where $a \in [1.19, 3.19]$

* $(-\infty, 1.19]$, which is the correct option.

D. $[a, \infty)$, where $a \in [0.19, 6.19]$

$[1.19, \infty)$, 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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8. Solve the linear inequality below. Then, choose the constant and interval combination that describes the solution set.

$$4x + 9 < 7x + 3$$

The solution is $(2.0, \infty)$, which is option A.

A. (a, ∞), where $a \in [-1, 2.3]$

* $(2.0, \infty)$, which is the correct option.

B. (a, ∞), where $a \in [-3.6, 0]$

$(-2.0, \infty)$, which corresponds to negating the endpoint of the solution.

C. $(-\infty, a)$, where $a \in [-5, 0]$

$(-\infty, -2.0)$, 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 $a \in [1, 8]$

$(-\infty, 2.0)$, 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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9. Solve the linear inequality below. Then, choose the constant and interval combination that describes the solution set.

$$3 - 8x < \frac{-52x - 3}{7} \leq 7 - 8x$$

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

A. $(a, b]$, where $a \in [-8, -5]$ and $b \in [-17, -11]$

$(-6.00, -13.00]$, which is the correct interval but negatives of the actual endpoints.

B. $[a, b)$, where $a \in [-6, -3]$ and $b \in [-16, -10]$

$[-6.00, -13.00)$, which corresponds to flipping the inequality and getting negatives of the actual endpoints.

C. $(-\infty, a] \cup (b, \infty)$, where $a \in [-9, -5]$ and $b \in [-17, -7]$

$(-\infty, -6.00] \cup (-13.00, \infty)$, which corresponds to displaying the and-inequality as an or-inequality AND flipping the inequality AND getting negatives of the actual endpoints.

D. $(-\infty, a) \cup [b, \infty)$, where $a \in [-7, -3]$ and $b \in [-13, -10]$

$(-\infty, -6.00) \cup [-13.00, \infty)$, which corresponds to displaying the and-inequality as an or-inequality and getting negatives of the actual endpoints.

E. None of the above.

* This is correct as the answer should be $(6.00, 13.00]$.

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

$$-6 + 5x < \frac{45x - 9}{5} \leq 6 + 8x$$

The solution is $(-1.05, 7.80]$, which is option C.

A. $(-\infty, a] \cup (b, \infty)$, where $a \in [-7.05, -0.05]$ and $b \in [7.8, 9.8]$

$(-\infty, -1.05] \cup (7.80, \infty)$, which corresponds to displaying the and-inequality as an or-inequality AND flipping the inequality.

B. $[a, b)$, where $a \in [-2.8, -0.6]$ and $b \in [6.8, 10.8]$

$[-1.05, 7.80)$, which corresponds to flipping the inequality.

C. $(a, b]$, where $a \in [-2.2, 0.1]$ and $b \in [7.8, 9.8]$

* $(-1.05, 7.80]$, which is the correct option.

D. $(-\infty, a) \cup [b, \infty)$, where $a \in [-1.3, 0.4]$ and $b \in [7.8, 11.8]$

$(-\infty, -1.05) \cup [7.80, \infty)$, 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.