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.

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

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

A. $(-\infty, a) \cup [b, \infty)$, where $a \in [8, 14]$ and $b \in [-6.4, -0.4]$

$(-\infty, 10.00) \cup [-4.40, \infty)$, which corresponds to displaying the and-inequality as an or-inequality AND flipping the inequality AND getting negatives of the actual endpoints.

B. $(-\infty, a] \cup (b, \infty)$, where $a \in [9, 12]$ and $b \in [-7.4, -2.4]$

$(-\infty, 10.00] \cup (-4.40, \infty)$, which corresponds to displaying the and-inequality as an or-inequality and getting negatives of the actual endpoints.

C. $(a, b]$, where $a \in [8, 14]$ and $b \in [-5.4, -3.4]$

$(10.00, -4.40]$, which corresponds to flipping the inequality and getting negatives of the actual endpoints.

D. $[a, b)$, where $a \in [7, 12]$ and $b \in [-9.4, -2.4]$

$[10.00, -4.40)$, which is the correct interval but negatives of the actual endpoints.

E. None of the above.

* This is correct as the answer should be $[-10.00, 4.40)$.

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

$$-10x - 4 > 5x - 5$$

The solution is $(-\infty, 0.067)$, which is option D.

A. $(-\infty, a)$, where $a \in [-0.44, 0.04]$

$(-\infty, -0.067)$, which corresponds to negating the endpoint of the solution.

B. (a, ∞), where $a \in [-0.89, -0.01]$

$(-0.067, \infty)$, 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. (a, ∞), where $a \in [0.06, 0.19]$

$(0.067, \infty)$, 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. $(-\infty, a)$, where $a \in [-0.03, 0.14]$

* $(-\infty, 0.067)$, 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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3. Solve the linear inequality below. Then, choose the constant and interval combination that describes the solution set.

$$\frac{-9}{7} + \frac{6}{4}x \geq \frac{8}{6}x + \frac{7}{9}$$

The solution is $[12.381, \infty)$, which is option D.

A. $[a, \infty)$, where $a \in [-14.38, -7.38]$

$[-12.381, \infty)$, which corresponds to negating the endpoint of the solution.

B. $(-\infty, a]$, where $a \in [11.38, 14.38]$

$(-\infty, 12.381]$, 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 $a \in [-13.38, -8.38]$

$(-\infty, -12.381]$, 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. $[a, \infty)$, where $a \in [12.38, 15.38]$

* $[12.381, \infty)$, 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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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 10.

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

A. $(-\infty, -7] \cup [13, \infty)$

This describes the values no less than 10 from 3

B. $(-7, 13)$

This describes the values less than 10 from 3

C. $[-7, 13]$

This describes the values no more than 10 from 3

D. $(-\infty, -7) \cup (13, \infty)$

This describes the values more than 10 from 3

E. None of the above

Options A-D described the values [more/less than] 10 units from 3, 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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5. Solve the linear inequality below. Then, choose the constant and interval combination that describes the solution set.

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

The solution is $(-\infty, -7.0)$ or $(-3.0, \infty)$, which is option A.

A. $(-\infty, a) \cup (b, \infty)$, where $a \in [-7, -6]$ and $b \in [-4, 1]$

* Correct option.

B. $(-\infty, a] \cup [b, \infty)$, where $a \in [3, 4]$ and $b \in [5, 11]$

Corresponds to including the endpoints AND negating.

C. $(-\infty, a] \cup [b, \infty)$, where $a \in [-12, -6]$ and $b \in [-5, -1]$

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

D. $(-\infty, a) \cup (b, \infty)$, where $a \in [1, 6]$ and $b \in [0, 8]$

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

$$-9x + 5 \leq -5x - 8$$

The solution is $[3.25, \infty)$, which is option B.

A. $(-\infty, a]$, where $a \in [0.25, 6.25]$

$(-\infty, 3.25]$, 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. $[a, \infty)$, where $a \in [-0.75, 4.25]$

* $[3.25, \infty)$, which is the correct option.

C. $[a, \infty)$, where $a \in [-3.25, 1.75]$

$[-3.25, \infty)$, which corresponds to negating the endpoint of the solution.

D. $(-\infty, a]$, where $a \in [-4.25, -1.25]$

$(-\infty, -3.25]$, 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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7. Solve the linear inequality below. Then, choose the constant and interval combination that describes the solution set.

$$\frac{10}{2} - \frac{9}{6}x \leq \frac{-5}{5}x + \frac{3}{4}$$

The solution is $[8.5, \infty)$, which is option A.

A. $[a, \infty)$, where $a \in [7.5, 10.5]$

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

B. $[a, \infty)$, where $a \in [-9.5, -7.5]$

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

C. $(-\infty, a]$, where $a \in [6.5, 16.5]$

$(-\infty, 8.5]$, 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!

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

$(-\infty, -8.5]$, 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.

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

More than 6 units from the number 3.

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

A. $(3, 9)$

This describes the values less than 3 from 6

B. $(-\infty, 3] \cup [9, \infty)$

This describes the values no less than 3 from 6

C. $(-\infty, 3) \cup (9, \infty)$

This describes the values more than 3 from 6

D. $[3, 9]$

This describes the values no more than 3 from 6

E. None of the above

Options A-D described the values [more/less than] 3 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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9. Solve the linear inequality below. Then, choose the constant and interval combination that describes the solution set.

$$-7 - 5x < \frac{-40x - 3}{9} \leq 9 - 8x$$

The solution is $(-12.00, 2.62]$, which is option C.

A. $[a, b)$, where $a \in [-18, -9]$ and $b \in [0.62, 7.62]$

$[-12.00, 2.62)$, which corresponds to flipping the inequality.

B. $(-\infty, a] \cup (b, \infty)$, where $a \in [-13, -8]$ and $b \in [-0.38, 4.62]$

$(-\infty, -12.00] \cup (2.62, \infty)$, which corresponds to displaying the and-inequality as an or-inequality AND flipping the inequality.

C. $(a, b]$, where $a \in [-13, -7]$ and $b \in [0.62, 3.62]$

* $(-12.00, 2.62]$, which is the correct option.

D. $(-\infty, a) \cup [b, \infty)$, where $a \in [-15, -10]$ and $b \in [1.62, 3.62]$

$(-\infty, -12.00) \cup [2.62, \infty)$, 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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10. Solve the linear inequality below. Then, choose the constant and interval combination that describes the solution set.

$$-4 + 3x > 5x \text{ or } 8 + 7x < 8x$$

The solution is $(-\infty, -2.0)$ or $(8.0, \infty)$, which is option C.

A. $(-\infty, a] \cup [b, \infty)$, where $a \in [-5, 0]$ and $b \in [6, 9]$

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

B. $(-\infty, a] \cup [b, \infty)$, where $a \in [-11, -7]$ and $b \in [-3, 6]$

Corresponds to including the endpoints AND negating.

C. $(-\infty, a) \cup (b, \infty)$, where $a \in [-6, 4]$ and $b \in [6, 12]$

* Correct option.

D. $(-\infty, a) \cup (b, \infty)$, where $a \in [-9, -6]$ and $b \in [2, 5]$

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