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

$$-8x + 4 < 3x + 3$$

The solution is $(0.091, \infty)$

A. (a, ∞), where $a \in [-0.02, 0.78]$

   * $(0.091, \infty)$, which is the correct option.

B. (a, ∞), where $a \in [-0.31, -0.03]$

   $(-0.091, \infty)$, which corresponds to negating the endpoint of the solution.

C. $(-\infty, a)$, where $a \in [-0.42, -0.09]$

   $(-\infty, -0.091)$, 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 $a \in [0, 0.12]$

   $(-\infty, 0.091)$, 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 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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12. Solve the linear inequality below. Then, choose the constant and interval combination that describes the solution set.

$$-6 - 5x \leq \frac{-19x - 7}{8} < 3 - 3x$$

The solution is None of the above.

A. $[a, b)$, where $a \in [1, 5]$ and $b \in [-12, -4]$

   $[1.95, -6.20)$, which is the correct interval but negatives of the actual endpoints.

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

   $(-\infty, 1.95) \cup [-6.20, \infty)$, which corresponds to displaying the and-inequality as an or-inequality AND flipping the inequality AND getting negatives of the actual endpoints.

C. $(a, b]$, where $a \in [0, 6]$ and $b \in [-9, -4]$

   $(1.95, -6.20]$, which corresponds to flipping the inequality and getting negatives of the actual endpoints.

D. $(-\infty, a] \cup (b, \infty)$, where $a \in [-1, 7]$ and $b \in [-9, -2]$

$(-\infty, 1.95] \cup (-6.20, \infty)$, 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 $[-1.95, 6.20)$.

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

$$\frac{-8}{4} - \frac{9}{6}x \geq \frac{-4}{9}x - \frac{10}{3}$$

The solution is $(-\infty, 1.263]$

A. $(-\infty, a]$, where $a \in [0.1, 2]$

* $(-\infty, 1.263]$, which is the correct option.

B. $(-\infty, a]$, where $a \in [-2.8, -0.8]$

$(-\infty, -1.263]$, which corresponds to negating the endpoint of the solution.

C. $[a, \infty)$, where $a \in [-6, 1]$

$[-1.263, \infty)$, 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.

D. $[a, \infty)$, where $a \in [-1, 9]$

$[1.263, \infty)$, 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 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. Using an interval or intervals, describe all the x-values within or including a distance of the given values.

No less than 4 units from the number 3.

The solution is $(-\infty, -1] \cup [7, \infty)$

A. $(-\infty, -1) \cup (7, \infty)$

This describes the values more than 4 from 3

B. $[-1, 7]$

This describes the values no more than 4 from 3

C. $(-\infty, -1] \cup [7, \infty)$

This describes the values no less than 4 from 3

D. $(-1, 7)$

This describes the values less than 4 from 3

E. None of the above

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

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

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

$$-9 + 5x > 6x \text{ or } -4 + 9x < 12x$$

The solution is $(-\infty, -9.0)$ or $(-1.333, \infty)$

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

* Correct option.

B. $(-\infty, a] \cup [b, \infty)$, where $a \in [-12, -7]$ and $b \in [-6, 2]$

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

C. $(-\infty, a] \cup [b, \infty)$, where $a \in [-1, 4]$ and $b \in [5, 14]$

Corresponds to including the endpoints AND negating.

D. $(-\infty, a) \cup (b, \infty)$, where $a \in [1, 5]$ and $b \in [7, 10]$

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.
