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

   Less than 9 units from the number 6.

   The solution is $(-3, 15)$, which is option B.

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

      This describes the values more than 9 from 6

   B. $(-3, 15)$

      This describes the values less than 9 from 6

   C. $[-3, 15]$

      This describes the values no more than 9 from 6

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

      This describes the values no less than 9 from 6

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

   $$-5x + 6 \leq 6x + 10$$

   The solution is $[-0.364, \infty)$, which is option D.

   A. $(-\infty, a]$, where $a \in [0.06, 1.68]$

      $(-\infty, 0.364]$, 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 $a \in [-0.51, -0.32]$

      $(-\infty, -0.364]$, 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. $[a, \infty)$, where $a \in [0.14, 0.87]$

      $[0.364, \infty)$, which corresponds to negating the endpoint of the solution.

   D. $[a, \infty)$, where $a \in [-0.57, 0.31]$

      * $[-0.364, \infty)$, 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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3. Solve the linear inequality below. Then, choose the constant and interval combination that describes the solution set.

$$-7 - 5x < \frac{-12x - 5}{3} \leq -9 - 9x$$

The solution is $(-5.33, -1.47]$, which is option D.

A. $(-\infty, a] \cup (b, \infty)$, where $a \in [-6, -4.5]$ and $b \in [-2.92, -0.6]$

$(-\infty, -5.33] \cup (-1.47, \infty)$, which corresponds to displaying the and-inequality as an or-inequality AND flipping the inequality.

B. $[a, b)$, where $a \in [-6.75, -3.75]$ and $b \in [-1.8, 0]$

$[-5.33, -1.47)$, which corresponds to flipping the inequality.

C. $(-\infty, a) \cup [b, \infty)$, where $a \in [-8.25, -3.75]$ and $b \in [-3.75, 0]$

$(-\infty, -5.33) \cup [-1.47, \infty)$, which corresponds to displaying the and-inequality as an or-inequality.

D. $(a, b]$, where $a \in [-6.75, -4.5]$ and $b \in [-2.25, 0]$

* $(-5.33, -1.47]$, which is the correct option.

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.

$$-4x - 6 < 9x + 3$$

The solution is $(-0.692, \infty)$, which is option D.

A. $(-\infty, a)$, where $a \in [-1.27, -0.48]$

$(-\infty, -0.692)$, 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 $a \in [0.09, 1.26]$

$(-\infty, 0.692)$, 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 $a \in [-0.05, 2.51]$

$(0.692, \infty)$, which corresponds to negating the endpoint of the solution.

D. (a, ∞), where $a \in [-1.55, -0.11]$

* $(-0.692, \infty)$, 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. Solve the linear inequality below. Then, choose the constant and interval combination that describes the solution set.

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

The solution is $(-\infty, -2.333)$ or $(5.0, \infty)$, which is option A.

A. $(-\infty, a) \cup (b, \infty)$, where $a \in [-2.85, -0.07]$ and $b \in [3, 6]$

* Correct option.

B. $(-\infty, a) \cup (b, \infty)$, where $a \in [-8.17, -3.52]$ and $b \in [-5.25, 4.5]$

Corresponds to inverting the inequality and negating the solution.

C. $(-\infty, a] \cup [b, \infty)$, where $a \in [-5.7, -4.65]$ and $b \in [-1.65, 4.35]$

Corresponds to including the endpoints AND negating.

D. $(-\infty, a] \cup [b, \infty)$, where $a \in [-3.67, -2.02]$ and $b \in [3.52, 6.3]$

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

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.

$$-8 + 5x \leq \frac{25x - 9}{4} < 9 + 3x$$

The solution is $[-4.60, 3.46)$, which is option D.

A. $(-\infty, a] \cup (b, \infty)$, where $a \in [-8.25, 2.25]$ and $b \in [-0.75, 5.25]$

$(-\infty, -4.60] \cup (3.46, \infty)$, which corresponds to displaying the and-inequality as an or-inequality.

B. $(-\infty, a) \cup [b, \infty)$, where $a \in [-5.25, -3.75]$ and $b \in [-1.5, 4.5]$

$(-\infty, -4.60) \cup [3.46, \infty)$, which corresponds to displaying the and-inequality as an or-inequality AND flipping the inequality.

C. $(a, b]$, where $a \in [-8.25, -3.75]$ and $b \in [3, 7.5]$

$(-4.60, 3.46]$, which corresponds to flipping the inequality.

D. $[a, b)$, where $a \in [-5.25, 3.75]$ and $b \in [1.5, 7.5]$

$[-4.60, 3.46)$, which is the correct option.

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

$$-7 + 8x > 11x \text{ or } 6 + 4x < 5x$$

The solution is $(-\infty, -2.333)$ or $(6.0, \infty)$, which is option A.

A. $(-\infty, a) \cup (b, \infty)$, where $a \in [-3.75, 0.75]$ and $b \in [4.5, 6.75]$

* Correct option.

B. $(-\infty, a] \cup [b, \infty)$, where $a \in [-5.25, 0.15]$ and $b \in [4.5, 15]$

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

C. $(-\infty, a] \cup [b, \infty)$, where $a \in [-6.6, -4.65]$ and $b \in [-1.5, 3]$

Corresponds to including the endpoints AND negating.

D. $(-\infty, a) \cup (b, \infty)$, where $a \in [-9.75, -5.25]$ and $b \in [2.25, 5.25]$

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

$$\frac{10}{3} - \frac{4}{9}x \geq \frac{4}{7}x + \frac{3}{5}$$

The solution is $(-\infty, 2.691]$, which is option A.

A. $(-\infty, a]$, where $a \in [0, 3.75]$

* $(-\infty, 2.691]$, which is the correct option.

B. $[a, \infty)$, where $a \in [2.25, 6]$

$[2.691, \infty)$, 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 $a \in [-6, -0.75]$

$(-\infty, -2.691]$, which corresponds to negating the endpoint of the solution.

D. $[a, \infty)$, where $a \in [-5.25, 0]$

$[-2.691, \infty)$, 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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9. Solve the linear inequality below. Then, choose the constant and interval combination that describes the solution set.

$$\frac{-4}{3} - \frac{5}{5}x \geq \frac{5}{4}x + \frac{7}{6}$$

The solution is $(-\infty, -1.111]$, which is option D.

A. $(-\infty, a]$, where $a \in [0.75, 4.5]$

$(-\infty, 1.111]$, which corresponds to negating the endpoint of the solution.

B. $[a, \infty)$, where $a \in [-2.32, -0.9]$

$[-1.111, \infty)$, 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. $[a, \infty)$, where $a \in [-0.22, 1.57]$

$[1.111, \infty)$, 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. $(-\infty, a]$, where $a \in [-6, 0.75]$

* $(-\infty, -1.111]$, 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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10. Using an interval or intervals, describe all the x-values within or including a distance of the given values.

No less than 6 units from the number 2.

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

A. $(4, 8)$

This describes the values less than 2 from 6

B. $(-\infty, 4) \cup (8, \infty)$

This describes the values more than 2 from 6

C. $(-\infty, 4] \cup [8, \infty)$

This describes the values no less than 2 from 6

D. $[4, 8]$

This describes the values no more than 2 from 6

E. None of the above

Options A-D described the values [more/less than] 2 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.
