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.

   No more than 2 units from the number 3.

   The solution is $[1, 5]$, which is option B.

   A. $(-\infty, 1] \cup [5, \infty)$

      This describes the values no less than 2 from 3

   B. $[1, 5]$

      This describes the values no more than 2 from 3

   C. $(-\infty, 1) \cup (5, \infty)$

      This describes the values more than 2 from 3

   D. $(1, 5)$

      This describes the values less than 2 from 3

   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.

   $$-10x + 6 \leq 7x + 8$$

   The solution is $[-0.118, \infty)$, which is option B.

   A. $[a, \infty)$, where $a \in [-0.03, 0.84]$

      $[0.118, \infty)$, which corresponds to negating the endpoint of the solution.

   B. $[a, \infty)$, where $a \in [-0.23, -0.04]$

      * $[-0.118, \infty)$, which is the correct option.

   C. $(-\infty, a]$, where $a \in [0, 0.21]$

      $(-\infty, 0.118]$, 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 $a \in [-0.13, 0.01]$

      $(-\infty, -0.118]$, 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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3. Solve the linear inequality below. Then, choose the constant and interval combination that describes the solution set.

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

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

A. $(-\infty, a] \cup [b, \infty)$, where $a \in [-9, -6]$ and $b \in [3.3, 4.3]$

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

B. $(-\infty, a] \cup [b, \infty)$, where $a \in [-5, -2]$ and $b \in [5.1, 10]$

Corresponds to including the endpoints AND negating.

C. $(-\infty, a) \cup (b, \infty)$, where $a \in [-5, -1]$ and $b \in [6, 8]$

Corresponds to inverting the inequality and negating the solution.

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

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

$$-9 - 8x \leq \frac{-54x + 6}{8} < 9 - 7x$$

The solution is $[-7.80, 33.00)$, which is option D.

A. $(a, b]$, where $a \in [-12.8, -4.8]$ and $b \in [33, 36]$

$(-7.80, 33.00]$, which corresponds to flipping the inequality.

B. $(-\infty, a) \cup [b, \infty)$, where $a \in [-8.8, -3.8]$ and $b \in [31, 37]$

$(-\infty, -7.80) \cup [33.00, \infty)$, which corresponds to displaying the and-inequality as an or-inequality AND flipping the inequality.

C. $(-\infty, a] \cup (b, \infty)$, where $a \in [-11.8, -1.8]$ and $b \in [33, 35]$

$(-\infty, -7.80] \cup (33.00, \infty)$, which corresponds to displaying the and-inequality as an or-inequality.

D. $[a, b)$, where $a \in [-7.8, -3.8]$ and $b \in [33, 39]$

$[-7.80, 33.00)$, 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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5. Solve the linear inequality below. Then, choose the constant and interval combination that describes the solution set.

$$-4 + 8x > 9x \text{ or } 3 + 6x < 7x$$

The solution is $(-\infty, -4.0)$ or $(3.0, \infty)$, which is option C.

A. $(-\infty, a] \cup [b, \infty)$, where $a \in [-3.34, -2.57]$ and $b \in [3.8, 4.5]$

Corresponds to including the endpoints AND negating.

B. $(-\infty, a) \cup (b, \infty)$, where $a \in [-3.5, -1.2]$ and $b \in [3.31, 4.55]$

Corresponds to inverting the inequality and negating the solution.

C. $(-\infty, a) \cup (b, \infty)$, where $a \in [-5.5, -3.6]$ and $b \in [2.76, 3.25]$

* Correct option.

D. $(-\infty, a] \cup [b, \infty)$, where $a \in [-4.31, -3.55]$ and $b \in [1.2, 3.5]$

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

More than 3 units from the number -9.

The solution is $(-\infty, -12) \cup (-6, \infty)$, which is option C.

A. $(-12, -6)$

This describes the values less than 3 from -9

B. $(-\infty, -12] \cup [-6, \infty)$

This describes the values no less than 3 from -9

C. $(-\infty, -12) \cup (-6, \infty)$

This describes the values more than 3 from -9

D. $[-12, -6]$

This describes the values no more than 3 from -9

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

$$-6 + 9x \leq \frac{75x - 6}{8} < -9 + 4x$$

The solution is $[-14.00, -1.53)$, which is option B.

A. $(-\infty, a] \cup (b, \infty)$, where $a \in [-15, -13]$ and $b \in [-2.53, -0.53]$

$(-\infty, -14.00] \cup (-1.53, \infty)$, which corresponds to displaying the and-inequality as an or-inequality.

B. $[a, b)$, where $a \in [-17, -13]$ and $b \in [-1.9, -1.1]$

$[-14.00, -1.53)$, which is the correct option.

C. $(-\infty, a) \cup [b, \infty)$, where $a \in [-17, -13]$ and $b \in [-2.53, 1.47]$

$(-\infty, -14.00) \cup [-1.53, \infty)$, which corresponds to displaying the and-inequality as an or-inequality AND flipping the inequality.

D. $(a, b]$, where $a \in [-14, -10]$ and $b \in [-2.53, 1.47]$

$(-14.00, -1.53]$, which corresponds to flipping the 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. Solve the linear inequality below. Then, choose the constant and interval combination that describes the solution set.

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

The solution is $(-\infty, -1.125)$, which is option C.

A. (a, ∞), where $a \in [-0.88, 3.12]$

$(1.125, \infty)$, 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 $a \in [-0.88, 5.12]$

$(-\infty, 1.125)$, which corresponds to negating the endpoint of the solution.

C. $(-\infty, a)$, where $a \in [-2.12, -0.12]$

* $(-\infty, -1.125)$, which is the correct option.

D. (a, ∞), where $a \in [-3.12, 0.88]$

$(-1.125, \infty)$, 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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9. Solve the linear inequality below. Then, choose the constant and interval combination that describes the solution set.

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

The solution is $[30.0, \infty)$, which is option B.

A. $(-\infty, a]$, where $a \in [29, 31]$

$(-\infty, 30.0]$, 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!

B. $[a, \infty)$, where $a \in [30, 31]$

* $[30.0, \infty)$, which is the correct option.

C. $[a, \infty)$, where $a \in [-32, -28]$

$[-30.0, \infty)$, which corresponds to negating the endpoint of the solution.

D. $(-\infty, a]$, where $a \in [-32, -29]$

$(-\infty, -30.0]$, 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.

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.

$$-9x + 10 > -6x - 5$$

The solution is $(-\infty, 5.0)$, which is option C.

A. $(-\infty, a)$, where $a \in [-8, -2]$

$(-\infty, -5.0)$, which corresponds to negating the endpoint of the solution.

B. (a, ∞), where $a \in [3, 6]$

$(5.0, \infty)$, 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!

C. $(-\infty, a)$, where $a \in [5, 9]$

* $(-\infty, 5.0)$, which is the correct option.

D. (a, ∞), where $a \in [-12, -4]$

$(-5.0, \infty)$, 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.

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.