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.

$$7x + 3 < 8x - 9$$

The solution is $(12.0, \infty)$, which is option D.

A. $(-\infty, a)$, where $a \in [-13, -10]$

$(-\infty, -12.0)$, 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.

B. (a, ∞), where $a \in [-18, -8]$

$(-12.0, \infty)$, which corresponds to negating the endpoint of the solution.

C. $(-\infty, a)$, where $a \in [7, 13]$

$(-\infty, 12.0)$, 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!

D. (a, ∞), where $a \in [9, 14]$

* $(12.0, \infty)$, 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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2. Using an interval or intervals, describe all the x-values within or including a distance of the given values.

Less than 4 units from the number -4.

The solution is $(-8, 0)$, which is option C.

A. $[-8, 0]$

This describes the values no more than 4 from -4

B. $(-\infty, -8) \cup (0, \infty)$

This describes the values more than 4 from -4

C. $(-8, 0)$

This describes the values less than 4 from -4

D. $(-\infty, -8] \cup [0, \infty)$

This describes the values no less than 4 from -4

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

$$-8 + 8x > 9x \text{ or } 4 + 9x < 10x$$

The solution is $(-\infty, -8.0)$ or $(4.0, \infty)$, which is option C.

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

Corresponds to inverting the inequality and negating the solution.

B. $(-\infty, a] \cup [b, \infty)$, where $a \in [-8, -7]$ and $b \in [2, 6]$

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

C. $(-\infty, a) \cup (b, \infty)$, where $a \in [-9, -7]$ and $b \in [3, 6]$

* Correct option.

D. $(-\infty, a] \cup [b, \infty)$, where $a \in [-5, -1]$ and $b \in [7, 12]$

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

$$5x + 5 \geq 10x - 3$$

The solution is $(-\infty, 1.6]$, which is option A.

A. $(-\infty, a]$, where $a \in [-1.4, 6.6]$

* $(-\infty, 1.6]$, which is the correct option.

B. $(-\infty, a]$, where $a \in [-1.6, -0.6]$

$(-\infty, -1.6]$, which corresponds to negating the endpoint of the solution.

C. $[a, \infty)$, where $a \in [-0.6, 3.4]$

$[1.6, \infty)$, 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. $[a, \infty)$, where $a \in [-3.4, -0.4]$

$[-1.6, \infty)$, 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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5. Using an interval or intervals, describe all the x-values within or including a distance of the given values.

$$\text{Less than 8 units from the number } -1.$$

The solution is $(-9, 7)$, which is option A.

A. $(-9, 7)$

   This describes the values less than 8 from -1

B. $(-\infty, -9] \cup [7, \infty)$

   This describes the values no less than 8 from -1

C. $[-9, 7]$

   This describes the values no more than 8 from -1

D. $(-\infty, -9) \cup (7, \infty)$

   This describes the values more than 8 from -1

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

$$\frac{4}{8} - \frac{6}{9}x \geq \frac{-3}{3}x + \frac{7}{6}$$

The solution is $[2.0, \infty)$, which is option C.

A. $[a, \infty)$, where $a \in [-2, -1]$

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

B. $(-\infty, a]$, where $a \in [2, 7]$

   $(-\infty, 2.0]$, 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!

C. $[a, \infty)$, where $a \in [2, 3]$

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

D. $(-\infty, a]$, where $a \in [-3, -1]$

   $(-\infty, -2.0]$, 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.

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.

$$-9+6x<\frac{56x+9}{9}\leq -7+6x$$

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

A. $(a,b]$, where $a\in[42,47]$ and $b\in[33,41]$

$(45.00, 36.00]$, which is the correct interval but negatives of the actual endpoints.

B. $(-\infty,a)\cup[b,\infty)$, where $a\in[42,49]$ and $b\in[35,41]$

$(-\infty, 45.00)\cup[36.00,\infty)$, which corresponds to displaying the and-inequality as an or-inequality and getting negatives of the actual endpoints.

C. $[a,b)$, where $a\in[45,51]$ and $b\in[36,39]$

$[45.00, 36.00)$, which corresponds to flipping the inequality and getting negatives of the actual endpoints.

D. $(-\infty,a]\cup(b,\infty)$, where $a\in[44,50]$ and $b\in[34,39]$

$(-\infty,45.00]\cup(36.00,\infty)$, which corresponds to displaying the and-inequality as an or-inequality AND flipping the inequality AND getting negatives of the actual endpoints.

E. None of the above.

* This is correct as the answer should be $(-45.00, -36.00]$.

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

$$-4+8x<\frac{76x+9}{9}\leq 9+3x$$

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

A. $(a,b]$, where $a\in[10.25,13.25]$ and $b\in[-1.47,-0.47]$

$(11.25,-1.47]$, which is the correct interval but negatives of the actual endpoints.

B. $[a,b)$, where $a\in[11.25,13.25]$ and $b\in[-4.47,-0.47]$

$[11.25,-1.47)$, which corresponds to flipping the inequality and getting negatives of the actual endpoints.

C. $(-\infty,a]\cup(b,\infty)$, where $a\in[9.25,19.25]$ and $b\in[-4.47,0.53]$

$(-\infty,11.25]\cup(-1.47,\infty)$, 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 $a\in[10.25,13.25]$ and $b\in[-3.47,-0.47]$

$(-\infty,11.25)\cup[-1.47,\infty)$, 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 $(-11.25, 1.47]$.

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

$$-6 + 3x > 5x \text{ or } -5 + 3x < 6x$$

The solution is $(-\infty, -3.0)$ or $(-1.667, \infty)$, which is option B.

A. $(-\infty, a] \cup [b, \infty)$, where $a \in [-5, 0]$ and $b \in [-6.67, -0.67]$

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

B. $(-\infty, a) \cup (b, \infty)$, where $a \in [-5, -1]$ and $b \in [-4.67, 0.33]$

   * Correct option.

C. $(-\infty, a) \cup (b, \infty)$, where $a \in [-0.33, 5.67]$ and $b \in [-1, 6]$

   Corresponds to inverting the inequality and negating the solution.

D. $(-\infty, a] \cup [b, \infty)$, where $a \in [-2.33, 2.67]$ and $b \in [3, 5]$

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

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

The solution is $(1.549, \infty)$, which is option D.

A. (a, ∞), where $a \in [-1.55, 1.45]$

   $(-1.549, \infty)$, which corresponds to negating the endpoint of the solution.

B. $(-\infty, a)$, where $a \in [-4.55, 0.45]$

   $(-\infty, -1.549)$, 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 $a \in [0.55, 4.55]$

   $(-\infty, 1.549)$, 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. (a, ∞), where $a \in [0.55, 3.55]$

   * $(1.549, \infty)$, 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.