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.

$$-9 - 3x \leq \frac{-10x + 8}{5} < -6 - 4x$$

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

A. $(a, b]$, where $a \in [6.6, 12.6]$ and $b \in [1.8, 5.8]$

$(10.60, 3.80]$, which corresponds to flipping the inequality and getting negatives of the actual endpoints.

B. $[a, b)$, where $a \in [9.6, 13.6]$ and $b \in [-1.2, 8.8]$

$[10.60, 3.80)$, which is the correct interval but negatives of the actual endpoints.

C. $(-\infty, a] \cup (b, \infty)$, where $a \in [9.6, 13.6]$ and $b \in [-3.2, 4.8]$

$(-\infty, 10.60] \cup (3.80, \infty)$, which corresponds to displaying the and-inequality as an or-inequality and getting negatives of the actual endpoints.

D. $(-\infty, a) \cup [b, \infty)$, where $a \in [4.6, 11.6]$ and $b \in [0.8, 10.8]$

$(-\infty, 10.60) \cup [3.80, \infty)$, 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 $[-10.60, -3.80)$.

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

No less than 10 units from the number 6.

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

A. $(-\infty, 4] \cup [16, \infty)$

This describes the values no less than 6 from 10

B. $(4, 16)$

This describes the values less than 6 from 10

C. $[4, 16]$

This describes the values no more than 6 from 10

D. $(-\infty, 4) \cup (16, \infty)$

This describes the values more than 6 from 10

E. None of the above

Options A-D described the values [more/less than] 6 units from 10, 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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3. Solve the linear inequality below. Then, choose the constant and interval combination that describes the solution set.

$$-9x - 10 \leq 8x + 3$$

The solution is $[-0.765, \infty)$, which is option D.

A. $(-\infty, a]$, where $a \in [0.4, 1.49]$

$(-\infty, 0.765]$, 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 $a \in [-2.6, 0.46]$

$(-\infty, -0.765]$, 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 $a \in [-0.4, 3]$

$[0.765, \infty)$, which corresponds to negating the endpoint of the solution.

D. $[a, \infty)$, where $a \in [-1.4, -0.1]$

* $[-0.765, \infty)$, 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. Solve the linear inequality below. Then, choose the constant and interval combination that describes the solution set.

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

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

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

* Correct option.

B. $(-\infty, a] \cup [b, \infty)$, where $a \in [-2, 3]$ and $b \in [6, 10]$

Corresponds to including the endpoints AND negating.

C. $(-\infty, a] \cup [b, \infty)$, where $a \in [-10, -6]$ and $b \in [-6, 0]$

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

D. $(-\infty, a) \cup (b, \infty)$, where $a \in [2, 4]$ and $b \in [7, 11]$

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

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

The solution is $[-2.7, \infty)$, which is option D.

A. $(-\infty, a]$, where $a \in [1.7, 3.7]$

$(-\infty, 2.7]$, 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. $[a, \infty)$, where $a \in [2.7, 4.7]$

$[2.7, \infty)$, which corresponds to negating the endpoint of the solution.

C. $(-\infty, a]$, where $a \in [-3.7, -0.7]$

$(-\infty, -2.7]$, 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 $a \in [-4.7, -1.7]$

* $[-2.7, \infty)$, 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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6. Solve the linear inequality below. Then, choose the constant and interval combination that describes the solution set.

$$4 + 3x < \frac{28x - 7}{3} \leq 8 + 8x$$

The solution is $(1.00, 7.75]$, which is option B.

A. $(-\infty, a] \cup (b, \infty)$, where $a \in [1, 2]$ and $b \in [7.75, 9.75]$

$(-\infty, 1.00] \cup (7.75, \infty)$, which corresponds to displaying the and-inequality as an or-inequality AND flipping the inequality.

B. $(a, b]$, where $a \in [0.5, 2]$ and $b \in [6.75, 10.75]$

* $(1.00, 7.75]$, which is the correct option.

C. $(-\infty, a) \cup [b, \infty)$, where $a \in [-0.6, 3.3]$ and $b \in [4.75, 11.75]$

$(-\infty, 1.00) \cup [7.75, \infty)$, which corresponds to displaying the and-inequality as an or-inequality.

D. $[a, b)$, where $a \in [0, 3.4]$ and $b \in [6.75, 10.75]$

$[1.00, 7.75)$, 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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7. Solve the linear inequality below. Then, choose the constant and interval combination that describes the solution set.

$$-7x - 5 \leq 7x - 9$$

The solution is $[0.286, \infty)$, which is option A.

A. $[a, \infty)$, where $a \in [0.1, 0.4]$

* $[0.286, \infty)$, which is the correct option.

B. $(-\infty, a]$, where $a \in [-0.92, -0.12]$

$(-\infty, -0.286]$, 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. $[a, \infty)$, where $a \in [-1.4, 0]$

$[-0.286, \infty)$, which corresponds to negating the endpoint of the solution.

D. $(-\infty, a]$, where $a \in [0.07, 0.71]$

$(-\infty, 0.286]$, 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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8. Solve the linear inequality below. Then, choose the constant and interval combination that describes the solution set.

$$\frac{10}{8} + \frac{7}{5}x > \frac{8}{3}x - \frac{8}{6}$$

The solution is $(-\infty, 2.039)$, which is option D.

A. (a, ∞), where $a \in [1.04, 6.04]$

$(2.039, \infty)$, 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!

B. (a, ∞), where $a \in [-4.04, -0.04]$

$(-2.039, \infty)$, 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. $(-\infty, a)$, where $a \in [-2.04, -1.04]$

$(-\infty, -2.039)$, which corresponds to negating the endpoint of the solution.

D. $(-\infty, a)$, where $a \in [1.04, 3.04]$

* $(-\infty, 2.039)$, 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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9. 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 -10.

The solution is $[-12, -8]$, which is option D.

A. $(-\infty, -12) \cup (-8, \infty)$

This describes the values more than 2 from -10

B. $(-\infty, -12] \cup [-8, \infty)$

This describes the values no less than 2 from -10

C. $(-12, -8)$

This describes the values less than 2 from -10

D. $[-12, -8]$

This describes the values no more than 2 from -10

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

$$6 + 9x > 12x \text{ or } 3 + 6x < 7x$$

The solution is $(-\infty, 2.0)$ or $(3.0, \infty)$, which is option A.

A. $(-\infty, a) \cup (b, \infty)$, where $a \in [0, 3]$ and $b \in [-1, 7]$

* Correct option.

B. $(-\infty, a] \cup [b, \infty)$, where $a \in [1, 5]$ and $b \in [2, 4]$

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

C. $(-\infty, a] \cup [b, \infty)$, where $a \in [-4, -2]$ and $b \in [-5, 1]$

Corresponds to including the endpoints AND negating.

D. $(-\infty, a) \cup (b, \infty)$, where $a \in [-4, 0]$ and $b \in [-6, 1]$

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.
