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.

$$4x - 6 \leq 9x + 6$$

The solution is $[-2.4, \infty)$, which is option C.

A. $[a, \infty)$, where $a \in [2.4, 5.4]$

$[2.4, \infty)$, which corresponds to negating the endpoint of the solution.

B. $(-\infty, a]$, where $a \in [-3.4, 1.6]$

$(-\infty, -2.4]$, 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 $a \in [-2.4, -0.4]$

* $[-2.4, \infty)$, which is the correct option.

D. $(-\infty, a]$, where $a \in [1.4, 4.4]$

$(-\infty, 2.4]$, 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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2. Solve the linear inequality below. Then, choose the constant and interval combination that describes the solution set.

$$3 + 5x > 7x \text{ or } 9 + 4x < 7x$$

The solution is $(-\infty, 1.5)$ or $(3.0, \infty)$, which is option C.

A. $(-\infty, a] \cup [b, \infty)$, where $a \in [-5, -2]$ and $b \in [-1.5, -0.5]$

Corresponds to including the endpoints AND negating.

B. $(-\infty, a) \cup (b, \infty)$, where $a \in [-4, 0]$ and $b \in [-2.5, 0.5]$

Corresponds to inverting the inequality and negating the solution.

C. $(-\infty, a) \cup (b, \infty)$, where $a \in [-0.5, 4.5]$ and $b \in [0, 4]$

* Correct option.

D. $(-\infty, a] \cup [b, \infty)$, where $a \in [-2.5, 4.5]$ and $b \in [3, 7]$

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

$$-5 + 9x > 11x \text{ or } 3 + 9x < 11x$$

The solution is $(-\infty, -2.5)$ or $(1.5, \infty)$, which is option A.

A. $(-\infty, a) \cup (b, \infty)$, where $a \in [-3.01, -2.47]$ and $b \in [1.4, 1.86]$

* Correct option.

B. $(-\infty, a] \cup [b, \infty)$, where $a \in [-1.8, 0.1]$ and $b \in [2.06, 3.51]$

Corresponds to including the endpoints AND negating.

C. $(-\infty, a) \cup (b, \infty)$, where $a \in [-1.81, -0.61]$ and $b \in [1.91, 2.59]$

Corresponds to inverting the inequality and negating the solution.

D. $(-\infty, a] \cup [b, \infty)$, where $a \in [-2.7, -2.19]$ and $b \in [1.38, 1.72]$

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

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

The solution is $(-\infty, 5.333]$, which is option A.

A. $(-\infty, a]$, where $a \in [4.33, 8.33]$

* $(-\infty, 5.333]$, which is the correct option.

B. $(-\infty, a]$, where $a \in [-6.33, -4.33]$

$(-\infty, -5.333]$, which corresponds to negating the endpoint of the solution.

C. $[a, \infty)$, where $a \in [-7.33, -1.33]$

$[-5.333, \infty)$, 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 $a \in [4.33, 8.33]$

$[5.333, \infty)$, 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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5. Solve the linear inequality below. Then, choose the constant and interval combination that describes the solution set.

$$-3x + 10 \leq 10x - 4$$

The solution is $[1.077, \infty)$, which is option A.

A. $[a, \infty)$, where $a \in [1, 2.7]$

   * $[1.077, \infty)$, which is the correct option.

B. $[a, \infty)$, where $a \in [-3.1, 0.6]$

   $[-1.077, \infty)$, which corresponds to negating the endpoint of the solution.

C. $(-\infty, a]$, where $a \in [-3.08, -0.08]$

   $(-\infty, -1.077]$, 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 $a \in [-0.92, 5.08]$

   $(-\infty, 1.077]$, 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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6. Using an interval or intervals, describe all the x-values within or including a distance of the given values.

$$\text{No more than 8 units from the number } -4.$$

The solution is $[-12, 4]$, which is option B.

A. $(-\infty, -12) \cup (4, \infty)$

   This describes the values more than 8 from -4

B. $[-12, 4]$

   This describes the values no more than 8 from -4

C. $(-\infty, -12] \cup [4, \infty)$

   This describes the values no less than 8 from -4

D. $(-12, 4)$

   This describes the values less than 8 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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7. Solve the linear inequality below. Then, choose the constant and interval combination that describes the solution set.

$$-7 - 8x < \frac{-36x - 4}{5} \leq 9 - 8x$$

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

A. $(a, b]$, where $a \in [3.75, 12.75]$ and $b \in [-15.25, -10.25]$

$(7.75, -12.25]$, which is the correct interval but negatives of the actual endpoints.

B. $[a, b)$, where $a \in [7.75, 11.75]$ and $b \in [-16.25, -9.25]$

$[7.75, -12.25)$, which corresponds to flipping the inequality and getting negatives of the actual endpoints.

C. $(-\infty, a] \cup (b, \infty)$, where $a \in [7.75, 8.75]$ and $b \in [-13.25, -9.25]$

$(-\infty, 7.75] \cup (-12.25, \infty)$, 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 $a \in [7.75, 10.75]$ and $b \in [-14.25, -11.25]$

$(-\infty, 7.75) \cup [-12.25, \infty)$, 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 $(-7.75, 12.25]$.

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.

$$-8 - 5x \leq \frac{-42x + 6}{9} < 9 - 9x$$

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

A. $(-\infty, a] \cup (b, \infty)$, where $a \in [22, 27]$ and $b \in [-5.92, -0.92]$

$(-\infty, 26.00] \cup (-1.92, \infty)$, which corresponds to displaying the and-inequality as an or-inequality and getting negatives of the actual endpoints.

B. $(-\infty, a) \cup [b, \infty)$, where $a \in [26, 28]$ and $b \in [-4.92, -0.92]$

$(-\infty, 26.00) \cup [-1.92, \infty)$, 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 $a \in [23, 29]$ and $b \in [-3.92, 1.08]$

$(26.00, -1.92]$, which corresponds to flipping the inequality and getting negatives of the actual endpoints.

D. $[a, b)$, where $a \in [25, 32]$ and $b \in [-4.92, -0.92]$

$[26.00, -1.92)$, which is the correct interval but negatives of the actual endpoints.

E. None of the above.

* This is correct as the answer should be $[-26.00, 1.92)$.

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.

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

The solution is $(-\infty, 1.837)$, which is option D.

A. (a, ∞), where $a \in [0.84, 2.84]$

$(1.837, \infty)$, 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 $a \in [-2.84, 0.16]$

$(-1.837, \infty)$, 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 $a \in [-1.84, 1.16]$

$(-\infty, -1.837)$, which corresponds to negating the endpoint of the solution.

D. $(-\infty, a)$, where $a \in [-0.16, 6.84]$

* $(-\infty, 1.837)$, 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.

Less than 7 units from the number 1.

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

A. $[6, 8]$

This describes the values no more than 1 from 7

B. $(-\infty, 6) \cup (8, \infty)$

This describes the values more than 1 from 7

C. $(6, 8)$

This describes the values less than 1 from 7

D. $(-\infty, 6] \cup [8, \infty)$

This describes the values no less than 1 from 7

E. None of the above

Options A-D described the values [more/less than] 1 units from 7, 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.