**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.*

---

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

$$-6 + 6x < \frac{46x - 6}{6} \leq 7 + 7x$$

The solution is $(-3.00, 12.00]$, which is option A.

A. $(a, b]$, where $a \in [-4, 2]$ and $b \in [6, 14]$

* $(-3.00, 12.00]$, which is the correct option.

B. $(-\infty, a] \cup (b, \infty)$, where $a \in [-7, 0]$ and $b \in [8, 14]$

$(-\infty, -3.00] \cup (12.00, \infty)$, which corresponds to displaying the and-inequality as an or-inequality AND flipping the inequality.

C. $[a, b)$, where $a \in [-3, -1]$ and $b \in [11, 14]$

$[-3.00, 12.00)$, which corresponds to flipping the inequality.

D. $(-\infty, a) \cup [b, \infty)$, where $a \in [-3, 0]$ and $b \in [12, 15]$

$(-\infty, -3.00) \cup [12.00, \infty)$, which corresponds to displaying the and-inequality as an or-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.

---

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

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

The solution is $(-\infty, -8.0)$ or $(-1.286, \infty)$, which is option A.

A. $(-\infty, a) \cup (b, \infty)$, where $a \in [-8, -5]$ and $b \in [-4.29, 2.71]$

* Correct option.

B. $(-\infty, a) \cup (b, \infty)$, where $a \in [-3.71, 2.29]$ and $b \in [7, 12]$

Corresponds to inverting the inequality and negating the solution.

C. $(-\infty, a] \cup [b, \infty)$, where $a \in [-0.71, 3.29]$ and $b \in [6, 11]$

Corresponds to including the endpoints AND negating.

D. $(-\infty, a] \cup [b, \infty)$, where $a \in [-12, -6]$ and $b \in [-3.29, 0.71]$

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.

---

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

$$8 - 9x \leq \frac{-43x - 5}{9} < 7 - 5x$$

The solution is $[2.03, 34.00)$, which is option B.

A. $(-\infty, a) \cup [b, \infty)$, where $a \in [1.03, 3.03]$ and $b \in [34, 38]$

$(-\infty, 2.03) \cup [34.00, \infty)$, which corresponds to displaying the and-inequality as an or-inequality AND flipping the inequality.

B. $[a, b)$, where $a \in [0.03, 9.03]$ and $b \in [34, 37]$

$[2.03, 34.00)$, which is the correct option.

C. $(a, b]$, where $a \in [-1.97, 4.03]$ and $b \in [33, 36]$

$(2.03, 34.00]$, which corresponds to flipping the inequality.

D. $(-\infty, a] \cup (b, \infty)$, where $a \in [-0.97, 6.03]$ and $b \in [30, 36]$

$(-\infty, 2.03] \cup (34.00, \infty)$, which corresponds to displaying the and-inequality as an or-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.

---

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

$$-6 + 3x > 4x \text{ or } -7 + 5x < 8x$$

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

A. $(-\infty, a) \cup (b, \infty)$, where $a \in [-6, -3]$ and $b \in [-4.33, 4.67]$

* Correct option.

B. $(-\infty, a] \cup [b, \infty)$, where $a \in [-7, -3]$ and $b \in [-4.33, -0.33]$

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

C. $(-\infty, a] \cup [b, \infty)$, where $a \in [1.33, 6.33]$ and $b \in [2, 10]$

Corresponds to including the endpoints AND negating.

D. $(-\infty, a) \cup (b, \infty)$, where $a \in [0.33, 3.33]$ and $b \in [5, 9]$

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.

---

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

$$\frac{9}{8} - \frac{6}{5}x \leq \frac{5}{4}x - \frac{10}{7}$$

The solution is $[1.042, \infty)$, which is option B.

A. $(-\infty, a]$, where $a \in [-1.9, -0.2]$

$(-\infty, -1.042]$, 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 $a \in [-0.96, 2.04]$

* $[1.042, \infty)$, which is the correct option.

C. $[a, \infty)$, where $a \in [-4.04, -0.04]$

$[-1.042, \infty)$, which corresponds to negating the endpoint of the solution.

D. $(-\infty, a]$, where $a \in [0.2, 2.2]$

$(-\infty, 1.042]$, 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.

---

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

$$-6x - 4 \geq -4x + 6$$

The solution is $(-\infty, -5.0]$, which is option D.

A. $[a, \infty)$, where $a \in [-6, -4]$

$[-5.0, \infty)$, 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!

B. $[a, \infty)$, where $a \in [-1, 15]$

$[5.0, \infty)$, 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.

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

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

D. $(-\infty, a]$, where $a \in [-5, -4]$

* $(-\infty, -5.0]$, 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.

---

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

More than 5 units from the number 6.

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

A. $(-\infty, -1) \cup (11, \infty)$

This describes the values more than 6 from 5

B. $(-1, 11)$

This describes the values less than 6 from 5

C. $(-\infty, -1] \cup [11, \infty)$

This describes the values no less than 6 from 5

D. $[-1, 11]$

This describes the values no more than 6 from 5

E. None of the above

Options A-D described the values [more/less than] 6 units from 5, 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.

---

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

More than 5 units from the number $-5$.

The solution is $(-\infty, -10) \cup (0, \infty)$, which is option C.

A. $(-\infty, -10] \cup [0, \infty)$

This describes the values no less than 5 from -5

B. $(-10, 0)$

This describes the values less than 5 from -5

C. $(-\infty, -10) \cup (0, \infty)$

This describes the values more than 5 from -5

D. $[-10, 0]$

This describes the values no more than 5 from -5

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.

---

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

$$\frac{5}{5} + \frac{3}{8}x > \frac{4}{9}x - \frac{7}{6}$$

The solution is $(-\infty, 31.2)$, which is option C.

A. $(a, \infty)$, where $a \in [-31.2, -30.2]$

$(-31.2, \infty)$, 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 $a \in [-31.2, -27.2]$

$(-\infty, -31.2)$, which corresponds to negating the endpoint of the solution.

C. $(-\infty, a)$, where $a \in [29.2, 33.2]$

* $(-\infty, 31.2)$, which is the correct option.

D. $(a, \infty)$, where $a \in [30.2, 35.2]$

$(31.2, \infty)$, 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.

---

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

$$3x + 7 \leq 4x - 3$$

The solution is $[10.0, \infty)$, which is option D.

A. $(-\infty, a]$, where $a \in [4, 13]$

$(-\infty, 10.0]$, 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. $(-\infty, a]$, where $a \in [-13, -9]$

$(-\infty, -10.0]$, 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.

C. $[a, \infty)$, where $a \in [-11, -8]$

$[-10.0, \infty)$, which corresponds to negating the endpoint of the solution.

D. $[a, \infty)$, where $a \in [9, 12]$

* $[10.0, \infty)$, 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.