

Solving linear equations and linear inequalities Answers and Explanations

Answer Key

1. B 2. C 3. C 4. A 5. B 6. A 7. D 8. B 9. C 10. D

Answer Explanations

1. **B.** In this problem, we are given the equation $5x+9=3x+5$ and asked to find the value of $x-3$. Here we will combine like terms: $5x+9=3x+5 \rightarrow 2x=-4 \rightarrow x=-2$. Knowing that $x=-2$, we can substitute this value in for x to find our value: $x-3 \rightarrow (-2)-3 \rightarrow -5$.
2. **C.** In this problem, we are given the equation $3x-4=-4x+10$ and asked to find the value of $x+5$. Here we will combine like terms: $3x-4=-4x+10 \rightarrow 7x=14 \rightarrow x=2$. Knowing that $x=2$, we can substitute this value in for x to find our value: $x+5 \rightarrow (2)+5 \rightarrow 7$.
3. **C.** In this problem, we are given the equation $x-\frac{44}{15}=\frac{2}{3}-\frac{4}{5}x$ and asked to find the value of x . Here we will simplify our fractions and combine like terms:
$$x-\frac{44}{15}=\frac{2}{3}-\frac{4}{5}x \rightarrow 15\left(x-\frac{44}{15}=\frac{2}{3}-\frac{4}{5}x\right) \rightarrow 15x-44=10-12x \rightarrow 27x=54 \rightarrow x=2$$
4. **A.** In this problem, we will utilize simplification and substitution to solve. Now when we compare the right side of the equation to the left we know that $24x=6 \times 4x$. Therefore, our equation is simply left with $18=6a$ which simplifies to $a=3$. $24x+18=6(4x+a) \rightarrow 24x+18=24x+6a \rightarrow 6a=18 \rightarrow a=3$.
5. **D.** In this problem, we are given the inequality $x-4 < 3x+4$ and asked to find a solution to the inequality. Here we will combine like terms: $x-4 < 3x+4 \rightarrow -2x < 8 \rightarrow x > -4$. Thus, the only answer choice with a value larger than -4 is answer choice (D).
6. **A.** Recall that inequalities are just like equations, with one big exception. If you're multiplying or dividing both sides of the inequality by a negative number, you must "flip" the sign to the other direction. Therefore, here in our inequality we have
 $5x-3 \geq 7x-5$ which simplifies to $-2x \geq -2$. After dividing both sides by -2 , we get $x \leq 1$. Thus, the only answer choice that contains a value that is greater than is answer choice (A).
7. **D.** For this problem we can approach it from two different angles: simplify and solve for the range of values of x or pluck points and determine the lowest. On standardized tests we always want to utilize the least time-consuming method; therefore, by solving for the range of values of x we can have a general idea of points to test. When we simplify our inequality, we get: $5x-4 \geq 1 \rightarrow 5x \geq 5 \rightarrow x \geq 1$. This means the lowest value in our range of x is 1. When we test this value, we get $5(1)-4 \geq 1 \rightarrow 1 \geq 1$. Even though $5(0)-4=-4$ and is lower than 1 it does not satisfy the inequality and is not a possible value of $5x-4$.
8. **B.** This problem tests our ability to interpret the nature of an inequality. The question asks when will $3x+7$ render a value less than that of $3x+5$. When we look at the two sides of the inequality we know that this will never be true. When we simplify the inequality, we get:
 $3x+7 < 3x+5 \rightarrow 7 < 5$ and we know that 7 is not less than 5; therefore, there is no solution.
9. **C.** Remember simplification and substitution applies to inequalities as well. On the right-hand side of our inequality we see that $12x-4$ can be simplified to $-4(1-3x)$; therefore, we can divide both sides of the inequality by -4 giving us $1-3x \leq -9$.

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10. **D.** In this problem, we are given the inequality $5x + 13 > 3x + 7$ and asked to find a solution to the inequality. Here we can combine like terms and keep our x -values on the left and the numerical values on the right.

$5x + 13 > 3x + 7 \rightarrow 2x > -6 \rightarrow x > -3$ Thus, the only answer choice with a value larger than -3 is answer choice (D).