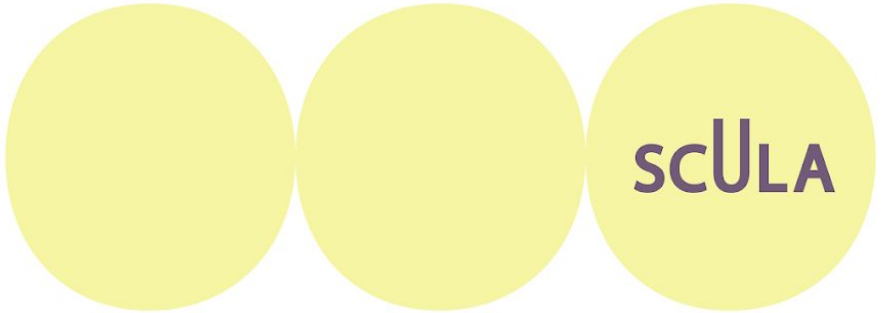
SAT MATH SECTION

INEQUALITIES

Graphical representations

Just like we dealt with equations and systems of equations,

Now, we will work on inequalities and systems of inequalities



Inequality

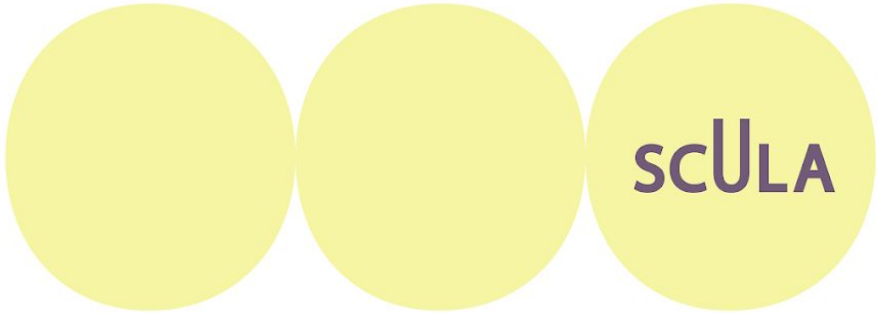
An example of an inequality is : $2x + 3 > 9$.

To solve this inequality, we need to isolate the variable x on one side.

$2x > 9 - 3$

$2x > 6$

$x > 3$



Reverse the sign if the coefficient is negative.

Let's consider now this equation: $-2x + 3 > 9$

$-2x + 3 > 9$

$-2x > 6$

$x < -3$

Let’s take another example.

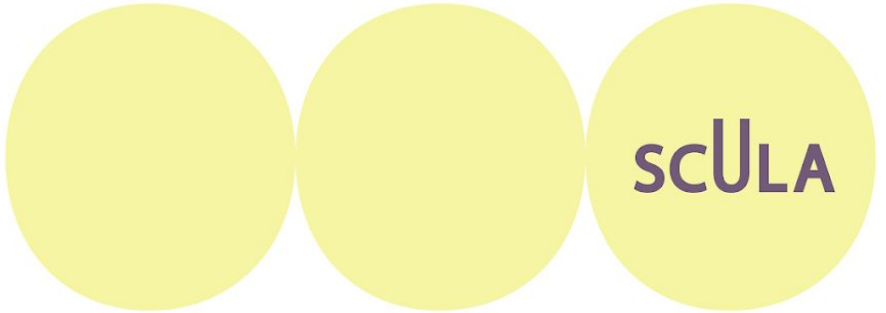
$3x + 5 < 4x + 4$

We should isolate x on one side to solve this inequality.

$3x - 4x < 4 - 5$

$-x < -1$

$x > 1$



EXAMPLE 1: Which of the following integers is a solution to the inequality $-3x - 7 \leq -7x - 27$?

A) -6 B) -3 C) 1 D) 4

$$-3x - 7 < -7x - 27$$
$$\Rightarrow -3x + 7x < 7 - 27$$
$$\Rightarrow 4x < -20$$
$$\Rightarrow x < -5$$

From the answer choices, the integer that is inferior to -5 is -6

EXAMPLE 2: If $-7 \leq -2x + 3 \leq 15$, which of the following must be true?

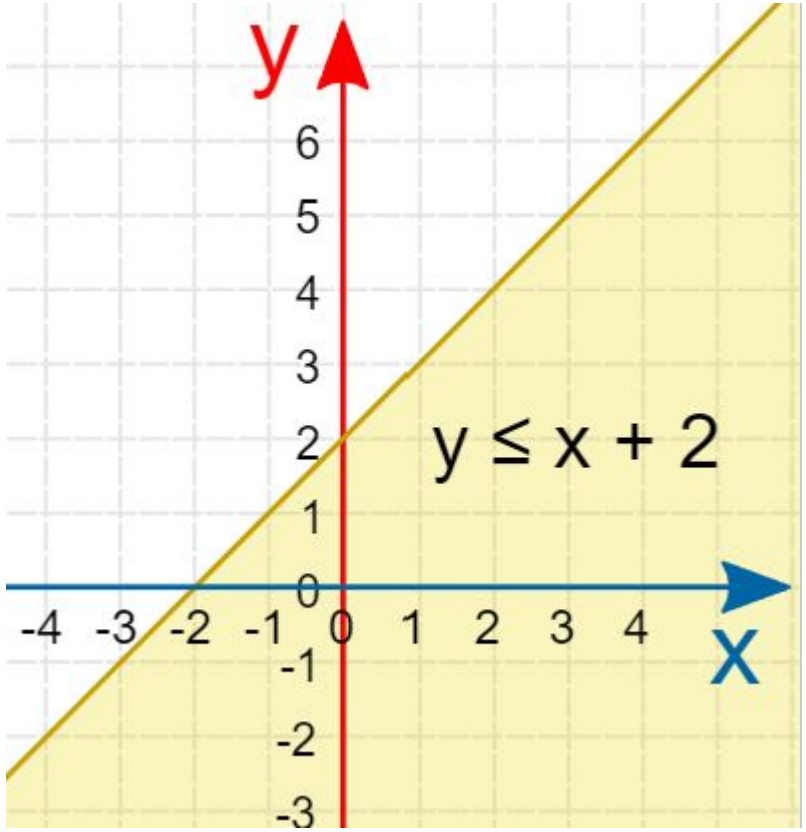
A) $5 \leq x \leq 6$ B) $-6 \leq x \leq -5$ C) $-6 \leq x \leq 5$ D) $-5 \leq x \leq 6$

$$-7 < -2x + 3 < 15$$
$$-7 - 3 < -2x < 15 - 3$$
$$-10 < -2x < 12$$
$$-5 < -x < 6$$
$$-6 < x < 5$$

Remember, to multiply by a negative number you need to switch the signs.

SCULA

Let's assess an inequality graphically



The line is the curve of the linear equation : y = x+2

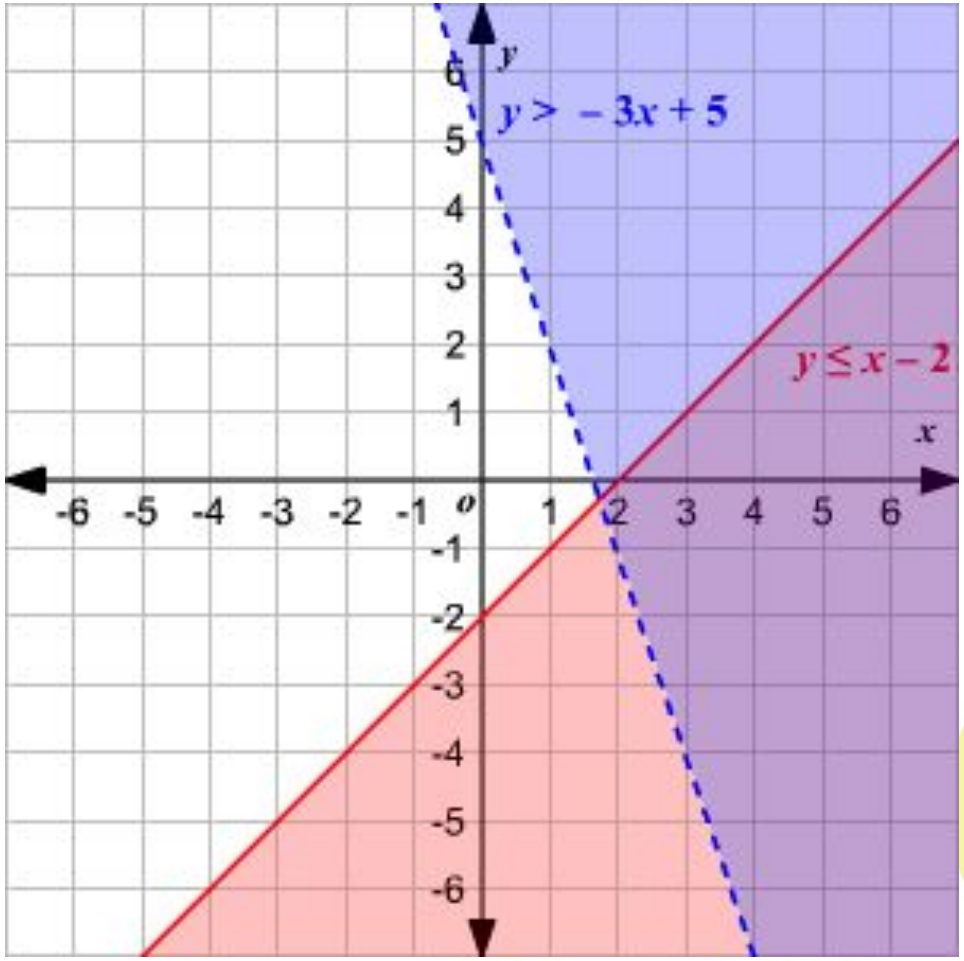
The operator ≤ indicates the parts of the quadrants that we are looking for.

SCULA

Solve a system of inequality graphically.

Remember that to solve a system, you need to verify both conditions given by two equations.

In this case, we need a solution that will verify both inequalities.



SCULA

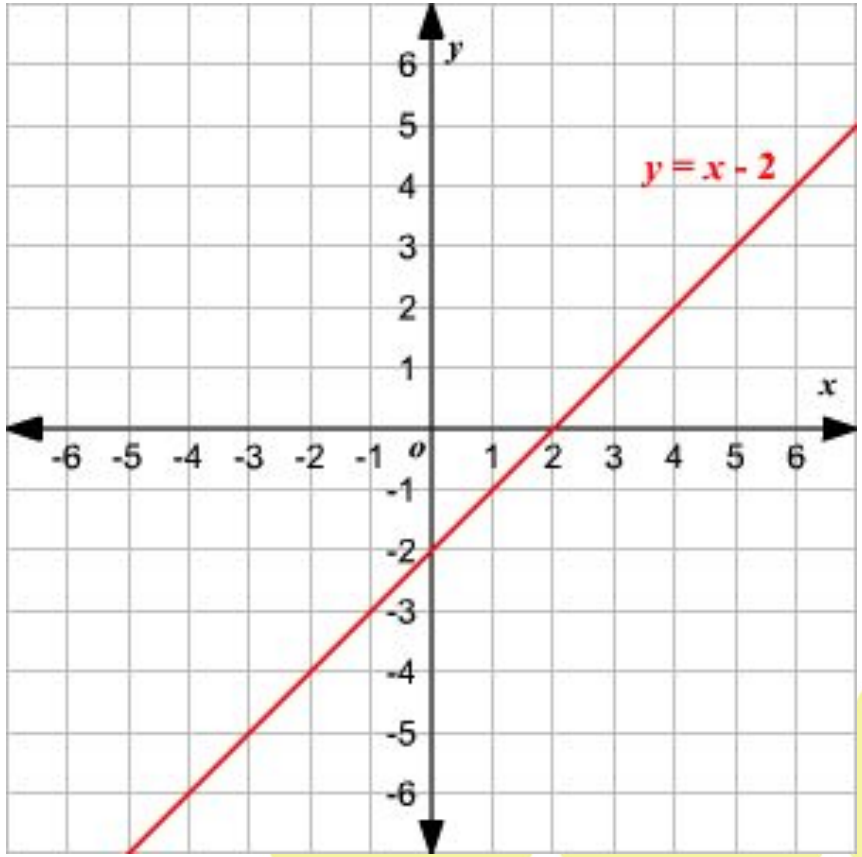
Example

Solve the system of inequalities by graphing:

$y \leq x-2$

$y>-3x+5$

First, graph the inequality $y \leq x-2$. The related equation is $y=x-2$



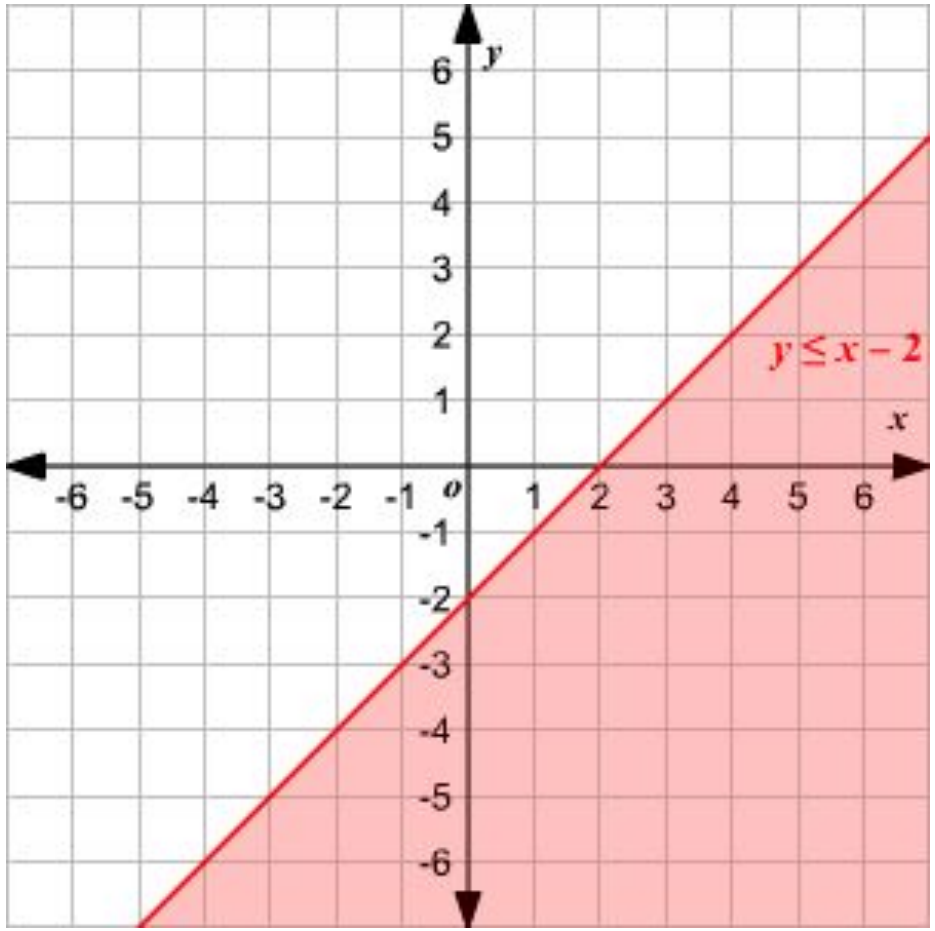
SCULA

Consider a point that is not on the line - say, (0,0) and substitute in the inequality $y \leq x-2$

$0 \leq 0-2$

$0 \leq -2$

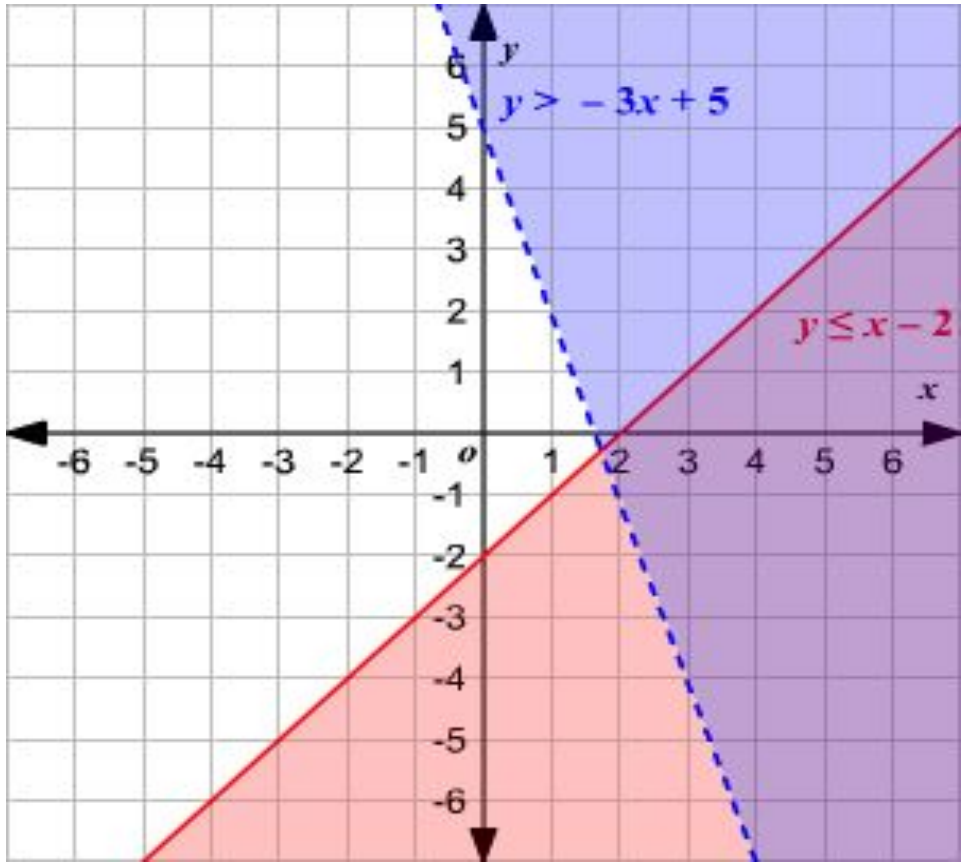
This is false. So, the solution does not contain the point (0,0). Shade the lower half of the line.



SCULA

Similarly, draw a dashed line for the related equation of the second inequality **y>−3x+5** which has a strict inequality.

The point (0,0) does not satisfy the inequality, so shade the half that does not contain the point (0,0)



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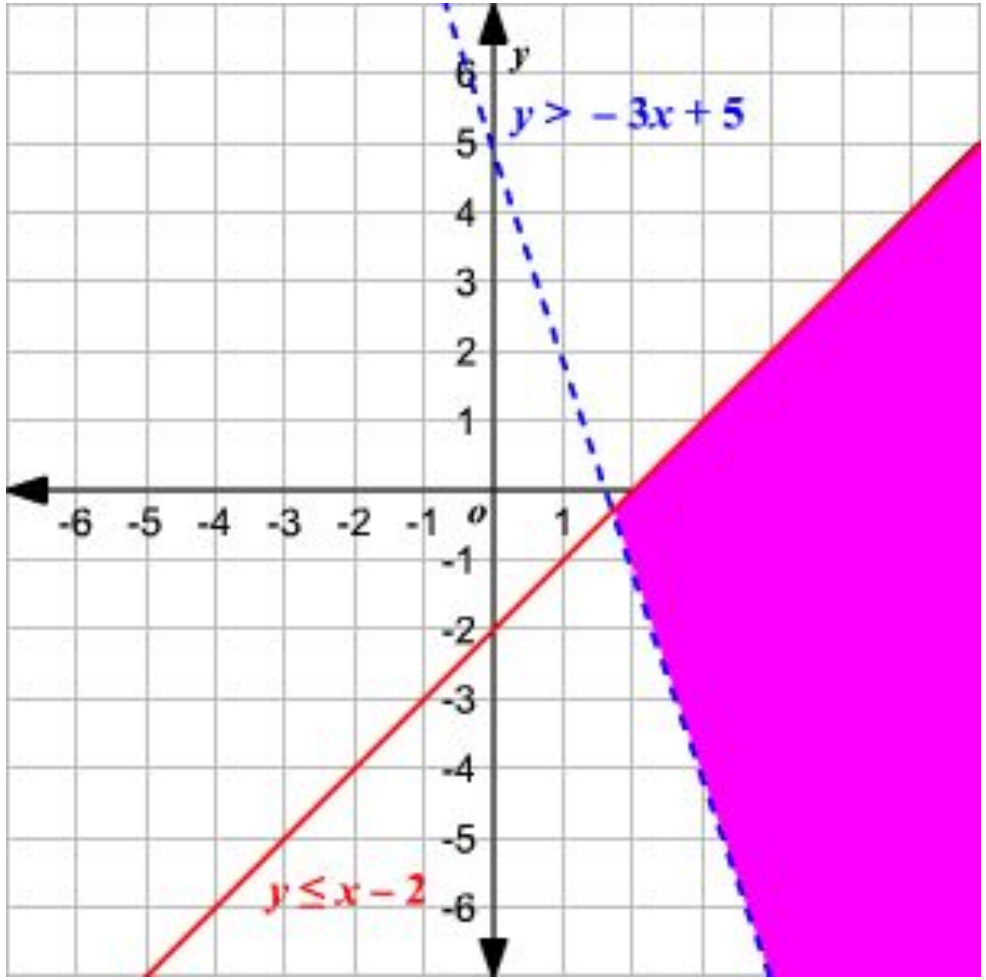
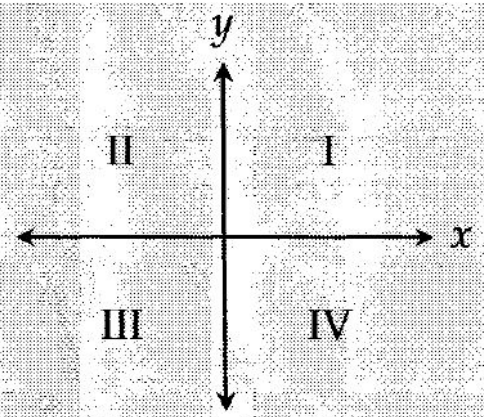


The solution of the system of inequalities is the intersection region of the solutions of the two inequalities.

SCULA



The following system of inequalities is graphed in the xy-plane above.

$$y \geq -3x + 1$$
$$y \geq 2x - 3$$

Which quadrants contain solutions to the system?

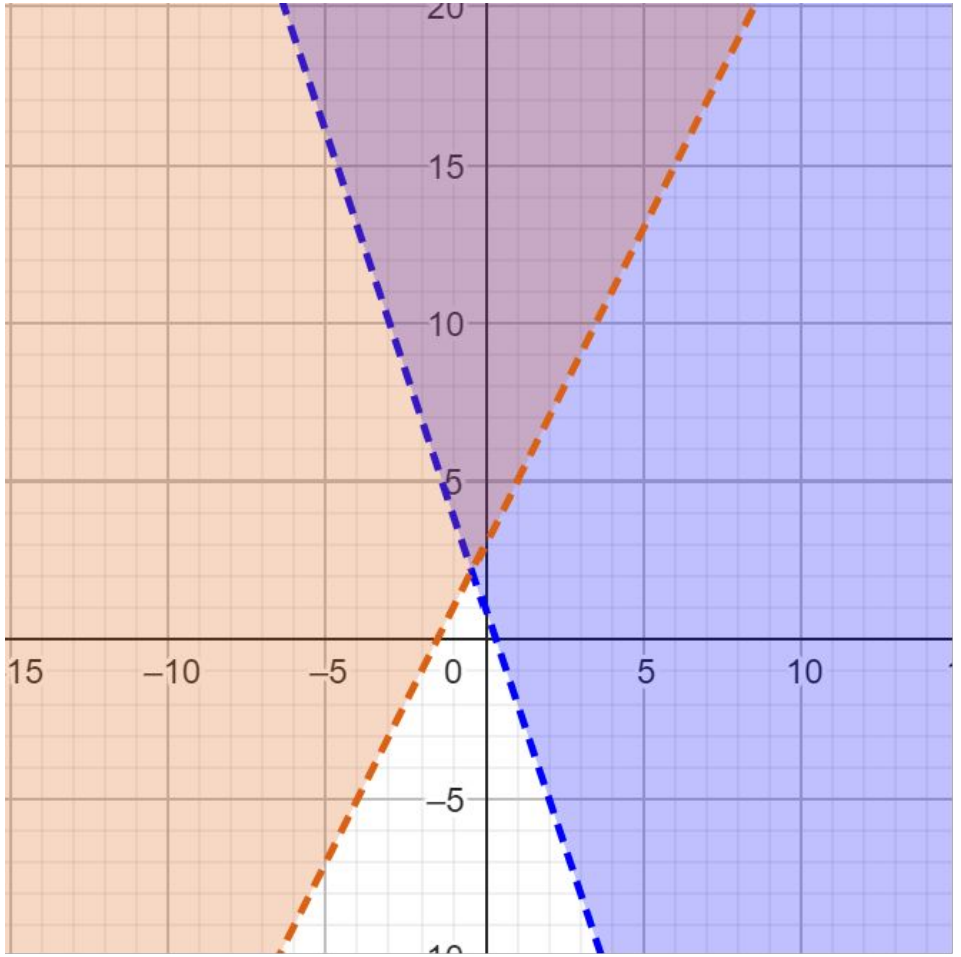
A) Quadrants I and II B) Quadrants I and IV C) Quadrants III and IV D) Quadrants I, II, and IV

The questions on the SAT will never ask you to graph the inequalities.

However, most questions will ask you to choose the right graphical representation of a system or choose the quadrants like this question.

The answer to this question is, according to the graph, located in quadrant I and II.

Thus, the right answer is A.



SCULA

PRACTICE

https://drive.google.com/file/d/1Vo_nWW_mdCGChD3ccGt3T5B_ngO1_LWo/view?usp=drive_link

THANK YOU!

DO YOU HAVE ANY QUESTIONS?