

Student Name

Mathematics Stage 5 Paths

FUNCTIONS AND OTHER GRAPHS

Book 3 Graph regions corresponding to linear
inequalities in one and 2 variables.

Version: 260207

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OVERVIEW

SYLLABUS CONTENT

MA5-FNC-P-01 uses function notation to describe and graph functions of one variable and graphs inequalities in one and 2 variables

Graph regions corresponding to linear inequalities in one and 2 variables

- Graph linear inequalities of the form $ax + by > c$, testing whether the points satisfy the given inequality and shading appropriate regions

REVIEW OF PRIOR KNOWLEDGE

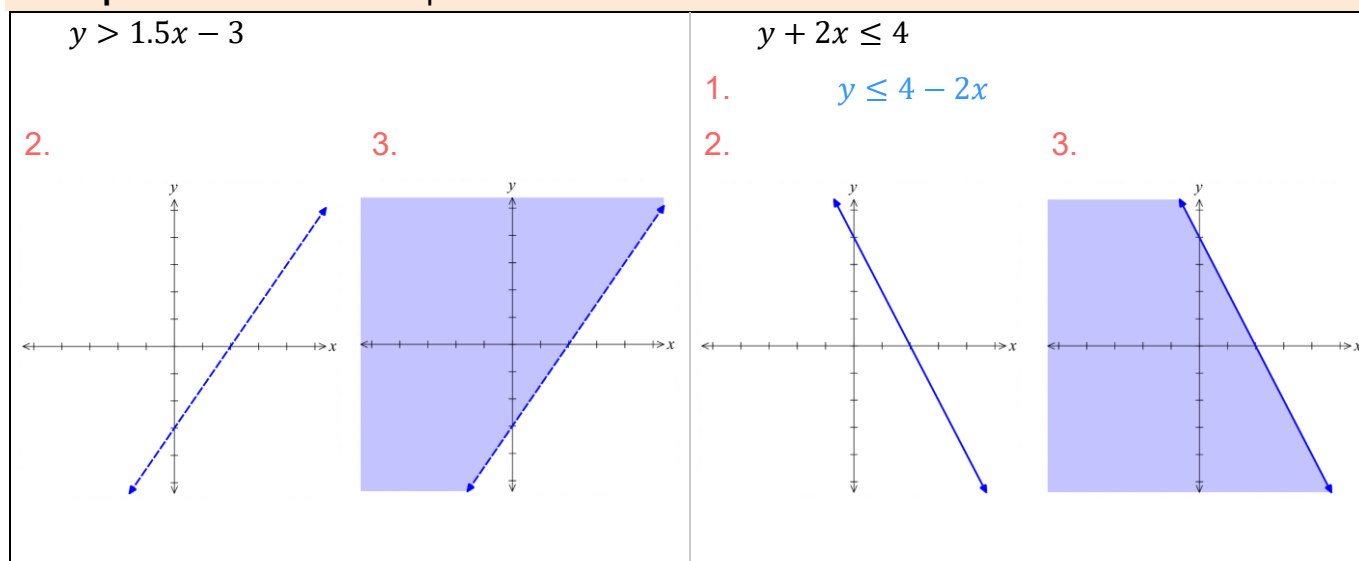
GRAPHS OF LINEAR INEQUALITIES

- An inequality, such as $2x - 5 > -10$ can be solved as $x > 2.5$.
- This solution can then be graphed on a number line:



- Linear inequalities of two variables** are regions on a Cartesian Plane.
 - Write the inequality in the form $y > mx + c$ or $y < mx + c$
 - Sketch the line $y = mx + c$.
 - $>$ or $<$: draw a dotted line.
 - $\geq$ or $\leq$: draw a solid line.
 - Shade above the line for $>$ or $\geq$ and below the line for $<$ or $\leq$.

Example Solve linear inequalities and sketch the result.



Why is the line dotted in the first example and solid in the second example?

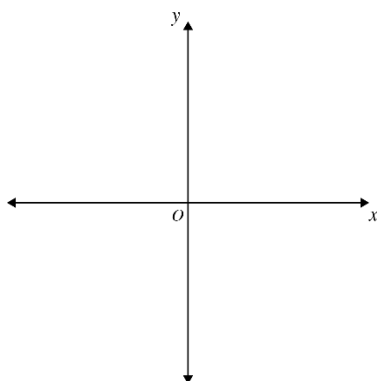
$>$ and $<$ mean to draw a line, $\geq$ and $\leq$ mean to draw a line.

How do we know whether to shade above the line or below the line?

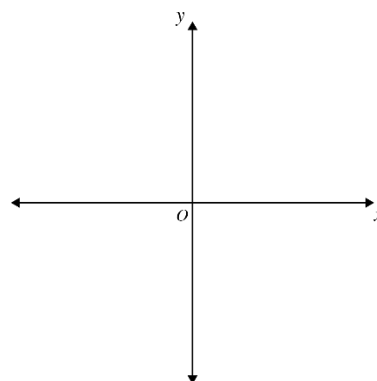
$y <$ or $y \leq$, shade $y >$ or $y \geq$, shade

Sketch these inequalities.

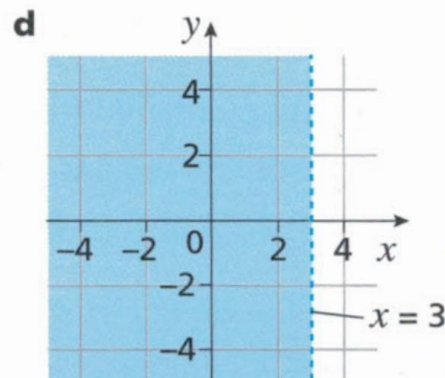
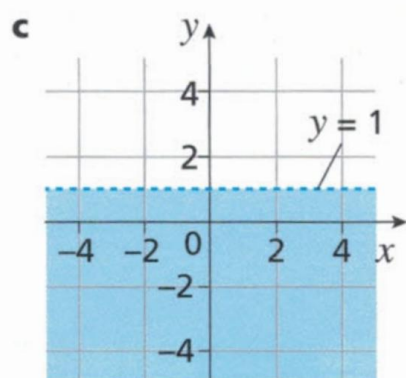
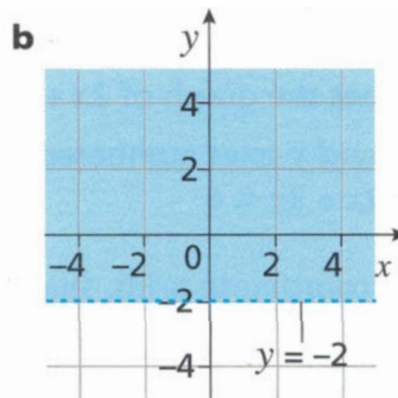
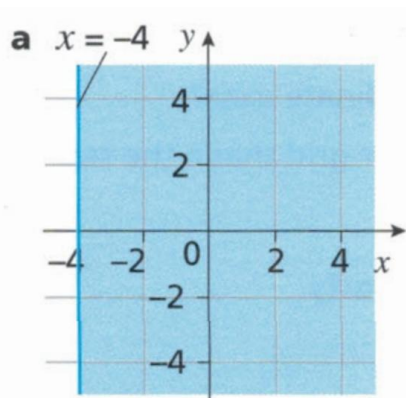
a $y < 3x - 1$



b $y + 4x \geq 6$

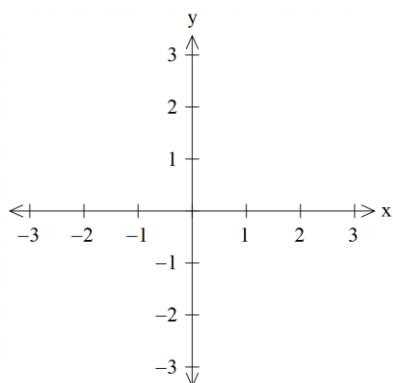


1 Write the inequality shown by each of these graphs,

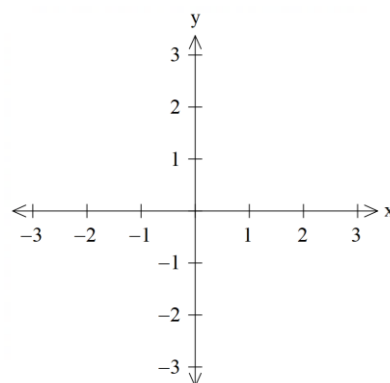


2 Shade the regions that satisfy these inequalities.

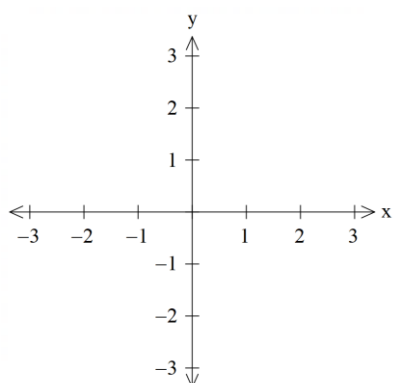
a $x < 1$



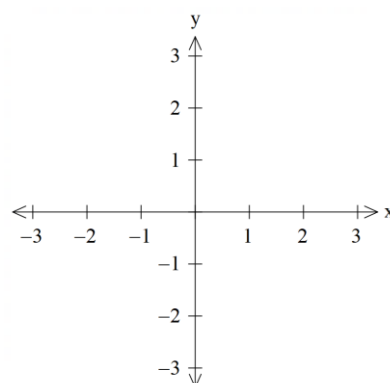
b $y > 2$



c $x > -1$



d $y \leq -1$

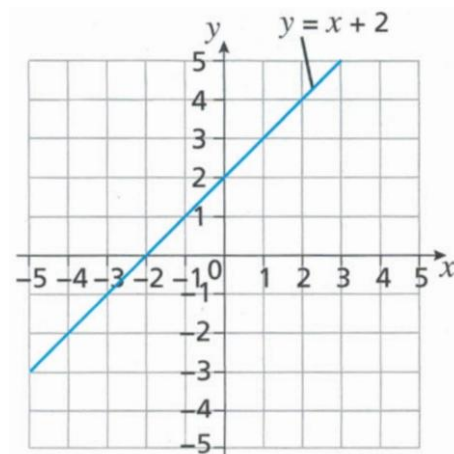


3 Here is the graph of $y = x + 2$

a Which of these points satisfy the inequality $y \leq x + 2$?

- A (2, 3) B (-2, 1)
C (-4, -1) D (-1, -3)

b Shade the region that satisfies $y \leq x + 2$

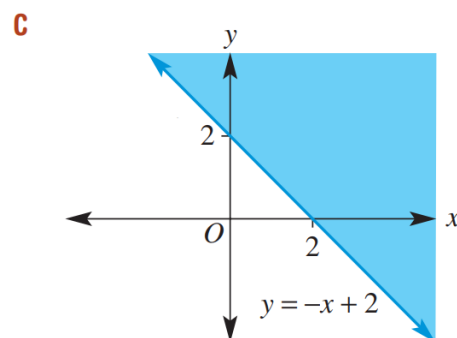
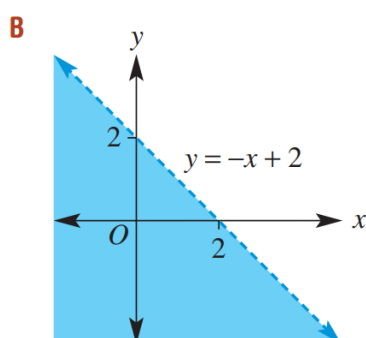
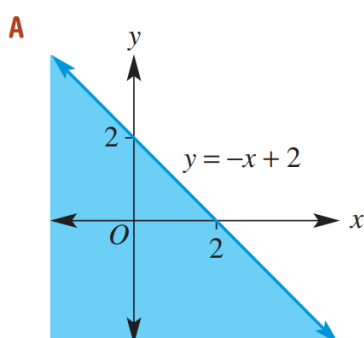


4 Match the rules with the graphs.

a $x + y < 2$

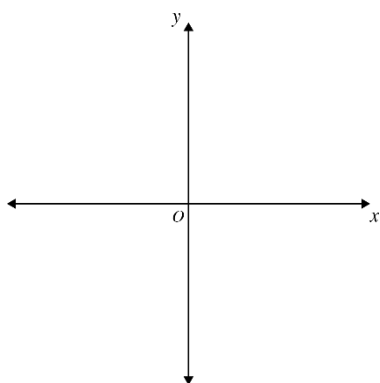
b $y \geq -x + 2$

c $y \leq -x + 2$

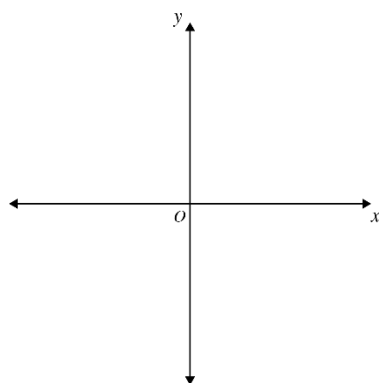


5 Sketch these linear inequalities on a Cartesian plane.

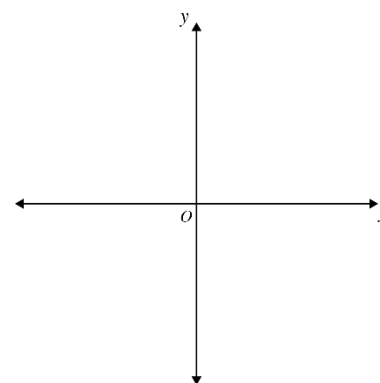
a $y \geq x + 4$



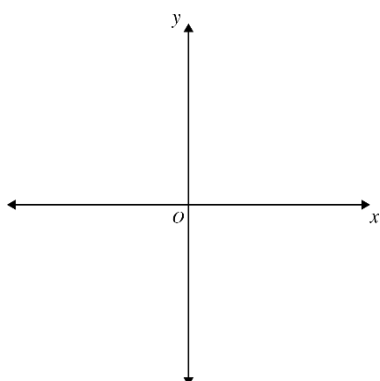
b $y < 3x - 6$



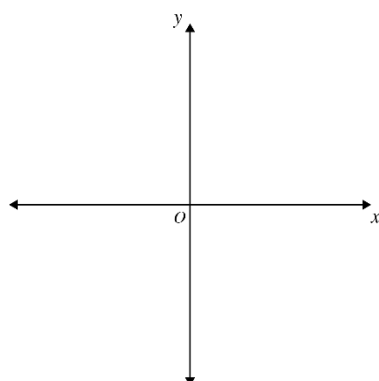
c $y > 2x - 8$



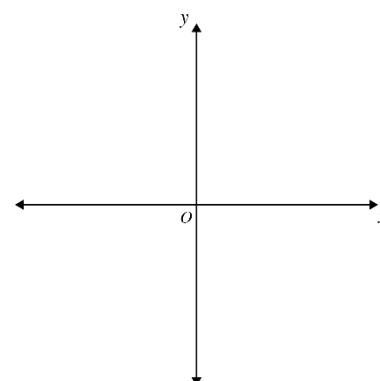
d $y \leq 3x - 5$



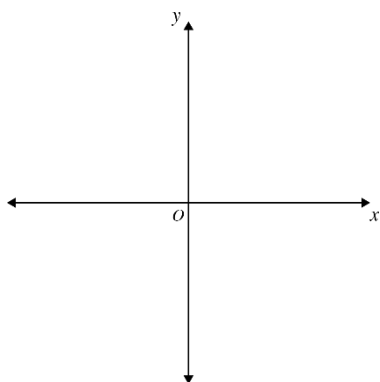
e $y < -4x + 2$



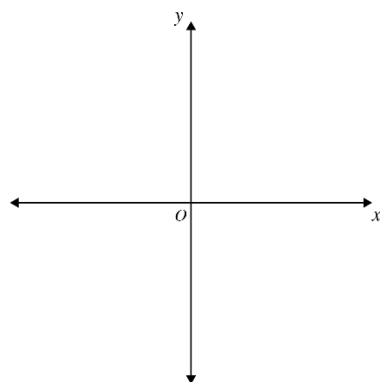
f $y \leq 4x$



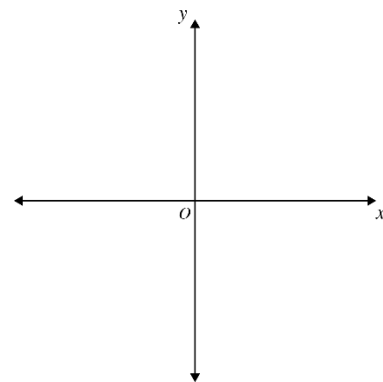
g $y > 6 - 3x$



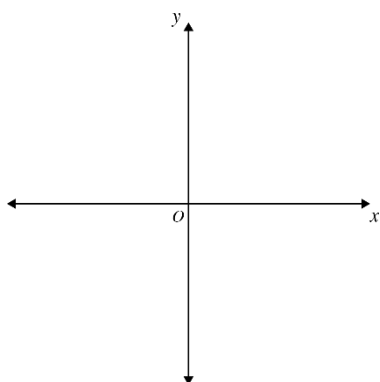
h $y \leq -x$



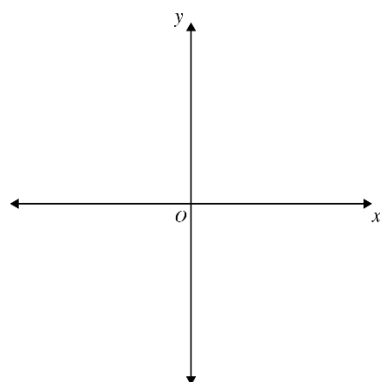
i $y > 2$



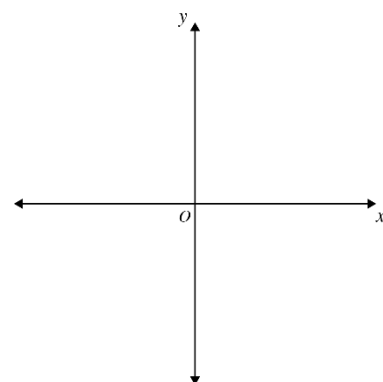
j $x < -2$



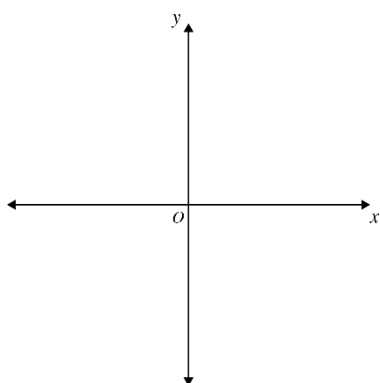
k $x > 3$



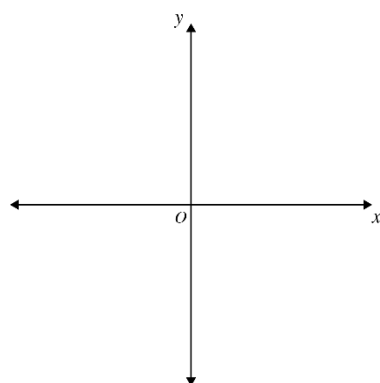
l $y \geq 2$



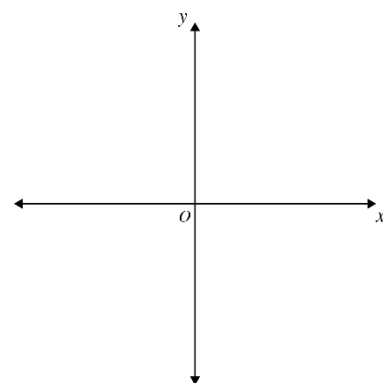
m $x + 3y < 9$



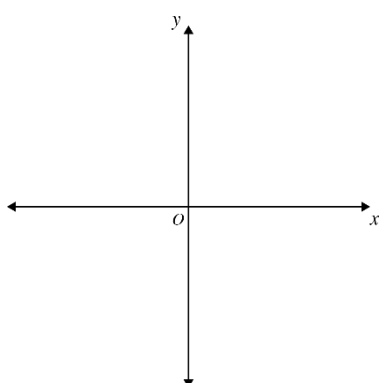
n $3x - y \geq 3$



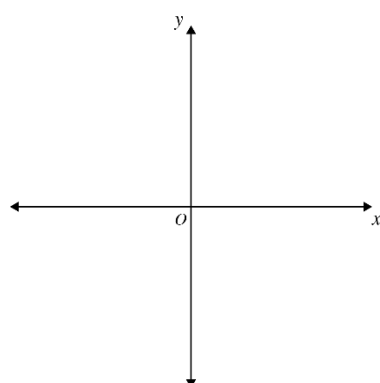
o $4x + 2y \geq 8$



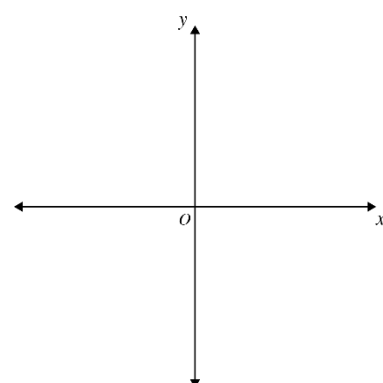
p $-2x + y \leq 5$



q $-2x + 4y \leq 6$

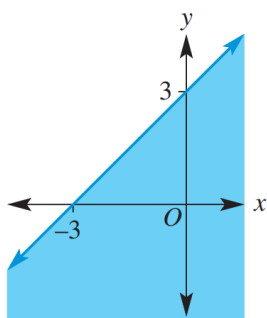


r $2x + 5y > -10$

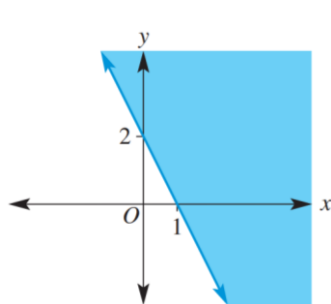


6 Write down the inequalities that give these solutions.

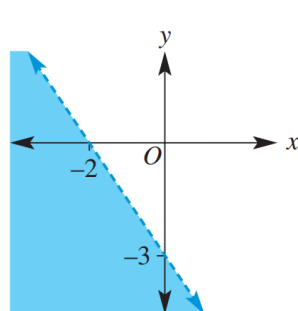
a



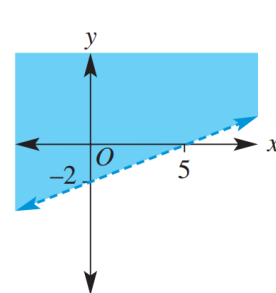
b



c



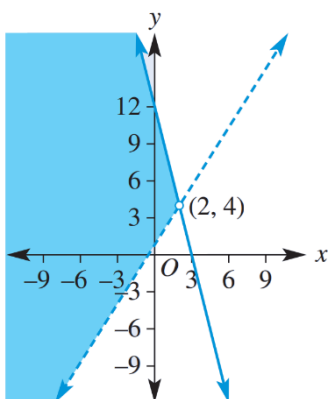
d



7 Sketch both inequalities on the same set of axes, shade the region of intersection and find the point of intersection of the two lines.

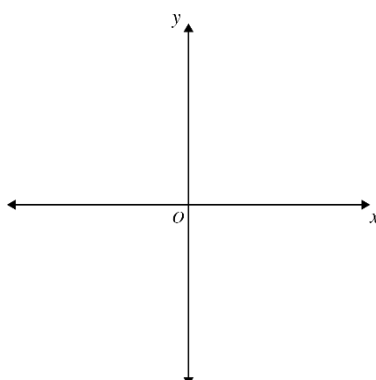
a $y \leq -4x + 12$

$y > \frac{3}{2}x + 1$



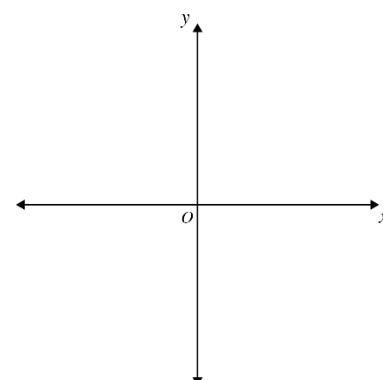
b $3x + 4y \leq 12$

$3x + y > 3$



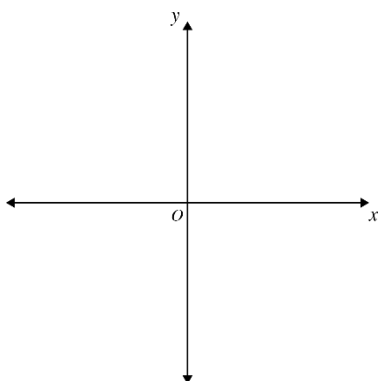
c $2x - 3y > 6$

$y < x - 2$



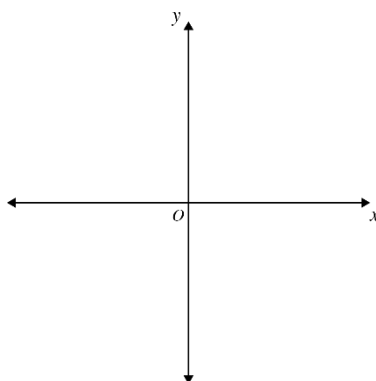
d $y \geq -x + 4$

$2x + 3y \geq 6$



e $2y - x \leq 5$

$y < 10 - x$



f $3x + 2y \leq 18$

$4y - x < 8$

