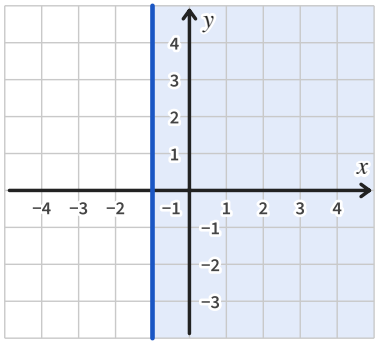
Inequalities on a Graph: Shading Regions

ANSWERS

1

Show $x \geq -1$ on the grid.
Shade the region.

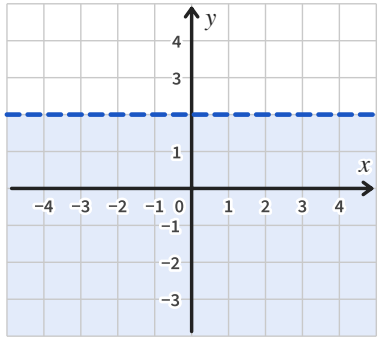


line: $x = -1$, solid

shade: the right

2

Show $y < 2$ on the grid. Shade the region.

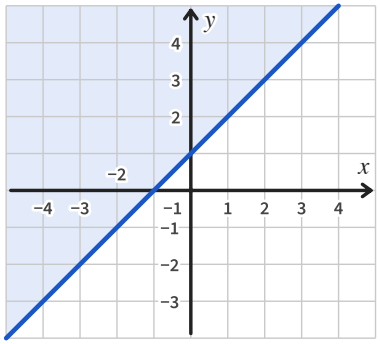


line: $y = 2$, dashed

shade: below

3

Show $y \geq x + 1$ on the grid.
Shade the region.

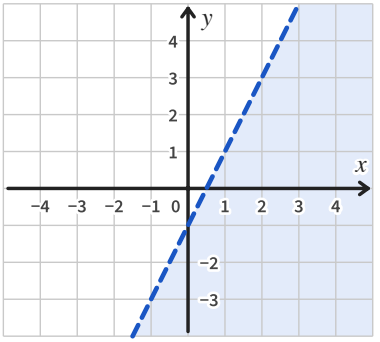


line: $y = x + 1$, solid

test (0, 0): $0 \geq 1$? No: shade above

4

Show $y < 2x - 1$ on the grid.
Shade the region.

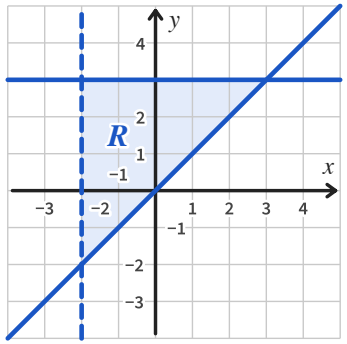


line: $y = 2x - 1$, dashed

test: (0, 0): $0 < -1$? No: below

5

Shade the region R where $x > -2$, $y \leq 3$ and $y \geq x$.



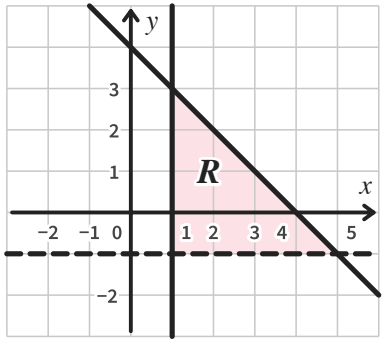
$x = -2$: dashed, the right

$y = 3$: solid, below

$y = x$: solid; (0, 2): above

6

Write down the three inequalities that describe the shaded region R.



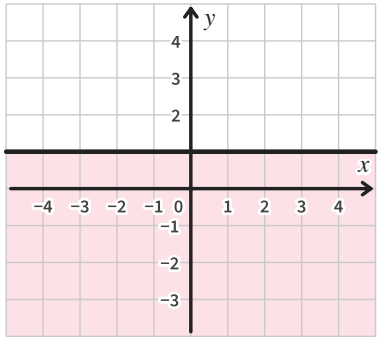
$x = 1$: $x \geq 1$

$y = -1$: $y > -1$

$x + y = 4$: $x + y \leq 4$

7

Ben shows $y > 1$ like this.
Explain his two mistakes.



1: the line should be dashed

2: shade above the line

8

Which of the points (1, 3), (2, 2) and (3, 6) are in the region $y > 2x - 1$?

(1, 3): $3 > 1$ ✓

(2, 2): $2 > 3$ ✗

(3, 6): $6 > 5$ ✓

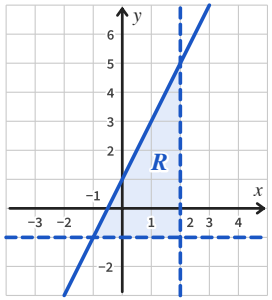
Answer (1, 3) and (3, 6)

Inequalities on a Graph: Shading Regions *further practice*

ANSWERS

9

Shade the region R where $y \leq 2x + 1$, $x < 2$ and $y > -1$.



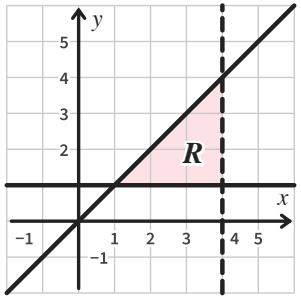
y = 2x + 1 solid; (0, 0): 0 ≤ 1

x = 2 and y = −1 dashed

Answer *R on the grid*

10

Write down the three inequalities that describe the shaded region R.



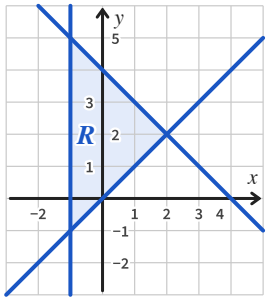
y = 1 solid, x = 4 dashed, y = x solid

(3, 2) is in R: 2 ≤ 3

Answer *y ≥ 1, x < 4, y ≤ x*

11

Shade the region R where $x + y \leq 4$, $y \geq x$ and $x \geq -1$.



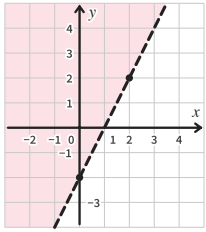
x + y = 4 goes through (0, 4) and (4, 0)

(0, 1) is in R: 1 ≤ 4, 1 ≥ 0

Answer *R on the grid*

12

The dashed line goes through (0, −2) and (2, 2). Write down the inequality that describes the shaded region.



gradient (2 − (−2)) ÷ 2 = 2, so y = 2x − 2

dashed, and the region is above

Answer *y > 2x − 2*

13

R is the region where $x > 0$, $y > 0$ and $x + y < 4$. List the points in R with whole number coordinates.

x and y at least 1

x + y is 2 or 3

Answer *(1, 1), (1, 2), (2, 1)*

14

Is the point (3, 4) in the region where $y < 2x - 1$ and $x + y \leq 7$?
Show how you know.

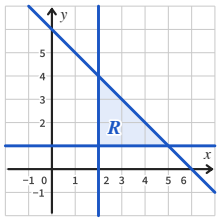
4 < 2 × 3 − 1 = 5 ✓

3 + 4 = 7 ≤ 7 ✓, on the solid line

Answer *Yes*

15

A café sells x cakes and y cookies an hour, where $x \geq 2$, $y \geq 1$ and $x + y \leq 6$. Shade the region. Can it sell 3 cakes and 4 cookies?



R has corners (2, 1), (5, 1) and (2, 4)

3 + 4 = 7, more than 6

Answer *No*

16

Explain why no point fits both $y > x + 2$ and $y < x - 1$.

the lines are parallel (gradient 1)

above the top one, below the bottom one

Answer *They never overlap*