LESSON MAKER PRO

Corners from Lines

Find polygon vertices by solving pairs of line equations.

HIGH SCHOOL · GDA.AF.A.3

GDA.AF.A.3 "Find the coordinates of the vertices of a polygon determined by a set of lines, given their equations, by setting their function rules equal and solving, or by using their graphs."

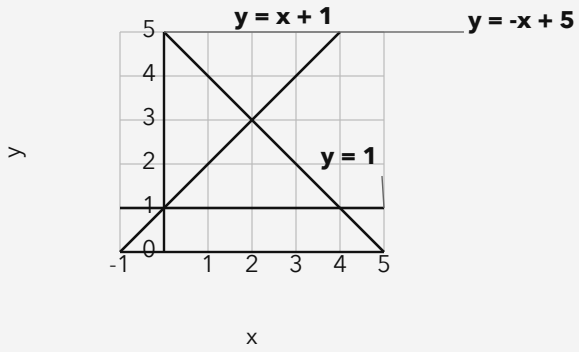
NAME _____ DATE _____

FIND EACH CORNER

A vertex is where two boundary lines meet. Set their rules equal to find x, then substitute x into either rule to find y. Repeat for each pair that forms a corner.

WORKED EXAMPLE

Find the vertices of the triangle formed by the graphed lines.



1. Set x + 1 = 1 and -x + 5 = 1. The horizontal line meets the others at x = 0 and x = 4.
2. Set x + 1 = -x + 5. Then x = 2 and y = 3.

Answer: (0, 1), (4, 1), (2, 3)

PRACTICE 4 problems

1 Find all vertices of the triangle formed by y = 2x + 2, y = -2x + 10, and y = 2.

ANSWER _____

2 Find all vertices of the triangle formed by y = 2x, y = -x + 6, and y = x/2.

ANSWER _____

3 Find all vertices of the triangle formed by y = 4, y = -2x + 4, and y = 2x - 4.

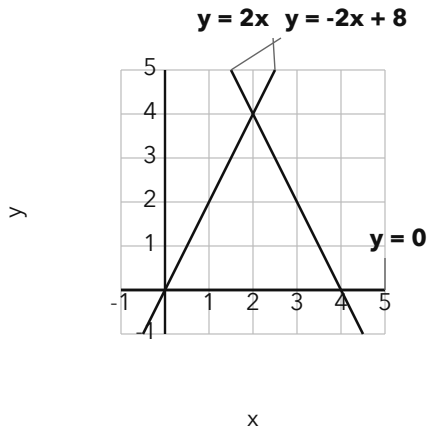
ANSWER _____

4 Find all vertices of the triangle formed by y = 3x - 6, y = -x + 6, and y = x + 2.

ANSWER _____

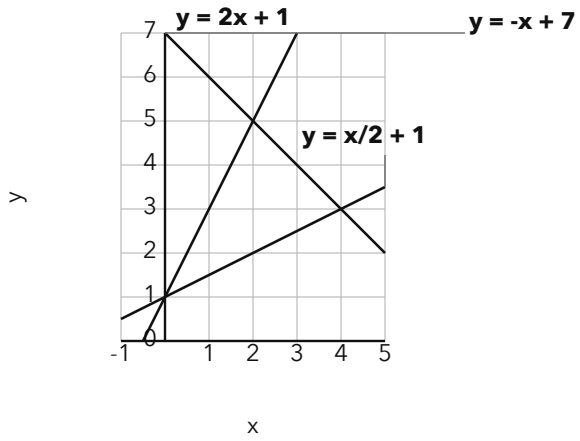
APPLY IT Show your work

1 A game design club graphs the borders of a triangular bonus zone. Find its vertices.



ANSWER _____

2 A mural club graphs three borders of a triangular color patch. Find its vertices.



ANSWER _____

CHALLENGE One step up

Four lines form a quadrilateral: y = 2x + 2, y = 2x - 2, y = -2x + 10, and y = -2x + 6. Find its vertices. Why are there only four?

WORK SPACE AND ANSWER

Corners from Lines

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Find all vertices of the triangle formed by y = 2x + 2, y = -2x + 10, and y = 2.	**(0, 2), (4, 2), (2, 6)**
2	Find all vertices of the triangle formed by y = 2x, y = -x + 6, and y = x/2.	**(0, 0), (2, 4), (4, 2)**
3	Find all vertices of the triangle formed by y = 4, y = -2x + 4, and y = 2x - 4.	**(0, 4), (4, 4), (2, 0)**
4	Find all vertices of the triangle formed by y = 3x - 6, y = -x + 6, and y = x + 2.	**(3, 3), (4, 6), (2, 4)**

PART 2 · APPLY IT

1. **(0, 0), (4, 0), (2, 4)** The sloped lines meet the horizontal line at (0, 0) and (4, 0). Setting 2x = -2x + 8 gives the third vertex, (2, 4).
2. **(0, 1), (2, 5), (4, 3)** Set each pair of rules equal. The three solutions give (0, 1), (2, 5), and (4, 3).

CHALLENGE

The vertices are (1, 4), (2, 6), (3, 4), and (2, 2). The two lines with slope 2 are parallel, as are the two lines with slope -2, so those pairs do not meet.

Accept vertices in any order. For the challenge, accept any explanation that identifies the two parallel pairs.