REFLECTIONS IN A LINE FROM ITS EQUATION

BUILDING BLOCKS

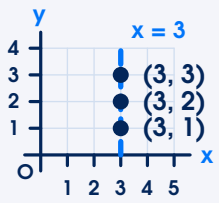
NAME _____ CLASS _____ DATE _____

KEY IDEA

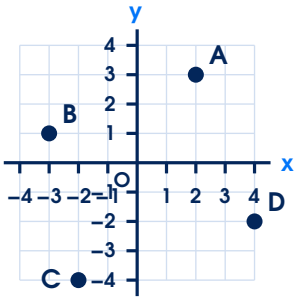
Every point on a vertical line has the same x-coordinate.

So this line is called x = 3.

On a horizontal line every point has the same y-coordinate, e.g. y = 2.



1 Write the coordinates of each point.



A = (☐ , ☐) B = (☐ , ☐)

C = (☐ , ☐) D = (☐ , ☐)

Across first (x), then up or down (y).

2 Each row of points lies on a line. Circle VERTICAL or HORIZONTAL. Write its equation.

a) (2, –1) (2, 0) (2, 3) VERTICAL HORIZONTAL ☐

b) (–1, 4) (3, 4) (0, 4) VERTICAL HORIZONTAL ☐

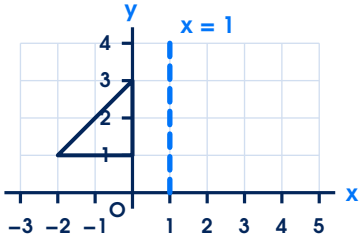
c) (–3, 2) (–3, –2) (–3, 0) VERTICAL HORIZONTAL ☐

3 Is each line vertical (V) or horizontal (H)? Write V or H.

Tip: x = ... lines are vertical. y = ... lines are horizontal.

a	b	c	d
x = 4	y = –1	y = 5	x = 0
V or H: ☐	V or H: ☐	V or H: ☐	V or H: ☐

4 Reflect the triangle in the line x = 1.



Count the squares from each corner across to the line x = 1.
Count the same number on the other side. Mark the new corner.
Join the new corners.

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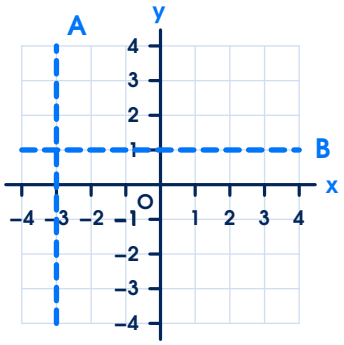
SUPPORT

NAME _____ CLASS _____ DATE _____

KEY IDEA

Lines with equation x = a are vertical (parallel to the y-axis). Lines with equation y = b are horizontal (parallel to the x-axis). The y-axis is the line x = 0 and the x-axis is the line y = 0. To reflect in a line, draw the line first.

1 Use the coordinate grid.



a) The equation of line A is ____

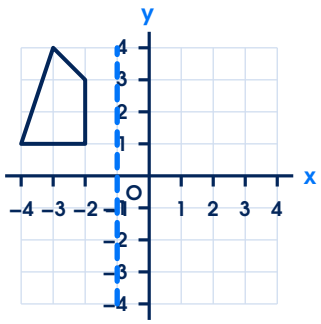
b) The equation of line B is ____

c) Draw and label the line x = 2.

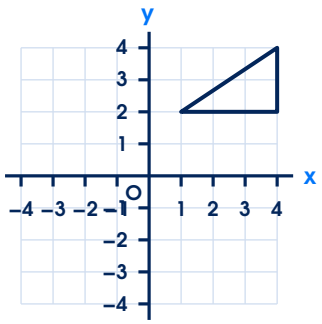
d) Draw and label the line y = –2.

2 Reflect each shape in the given line.

a) in x = –1



b) in y = 1 draw the line first



3 Is each statement true or false? Circle your answer.

a) The line x = 0 is the x-axis. TRUE FALSE

b) The line y = 3 is horizontal. TRUE FALSE

c) The line x = 5 is parallel to the x-axis. TRUE FALSE

4 Reflect each point without a grid.

a) Reflect (5, 2) in the line x = 3. Image: ____

b) Reflect (1, –1) in the line y = 2. Image: ____

c) Reflect (–2, 4) in the line x = 0. Image: ____

REFLECTIONS IN A LINE FROM ITS EQUATION

CORE

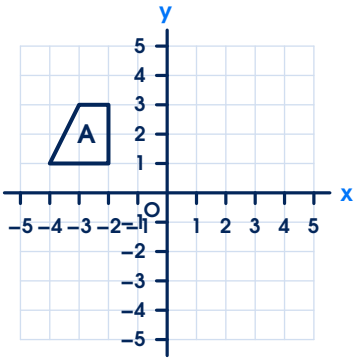
NAME _____ CLASS _____ DATE _____

KEY IDEA

Draw the mirror line first: x = a is vertical, y = b is horizontal, y = x and y = –x are the diagonals through the origin. Then reflect each vertex, measuring at right angles to the line.

FLUENCY

1 Use the coordinate grid.



a) Draw the line x = –1.
Reflect A in x = –1. Label it B.

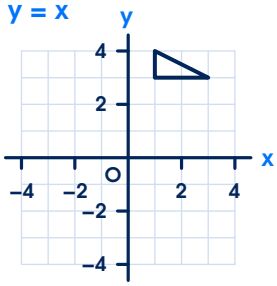
b) Draw the line y = –1.
Reflect A in y = –1. Label it C.

Where does the vertex (–2, 3) go?

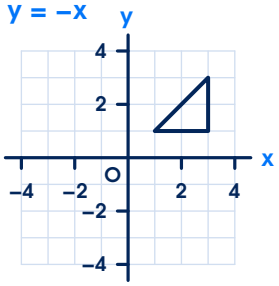
c) in B _____ **d)** in C _____

2 Draw the mirror line, then reflect the triangle in it.

a) Reflect in y = x



b) Reflect in y = –x



REASONING

3 Reflect each point in the line given. Write the coordinates of its image.

a) (5, 2) in x = 3 → _____

b) (–1, 4) in y = 1 → _____

c) (2, –3) in y = x → _____

d) (0, 6) in y = –x → _____

4 Mo says, "The line x = 4 is horizontal because it goes across through 4." Explain why Mo is wrong.

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REFLECTIONS IN A LINE FROM ITS EQUATION

GREATER DEPTH

NAME _____ CLASS _____ DATE _____

REASONING

1 Is each statement always, sometimes or never true? Circle your answer.

If it is sometimes true, sketch an example of when it is true and when it is not.

a) Reflecting (a, b) in x = 0 gives (–a, b). ALWAYS SOMETIMES NEVER

b) Reflecting in x = 3 changes the y-coordinate. ALWAYS SOMETIMES NEVER

c) Reflected in y = 2, a point ends below the line. ALWAYS SOMETIMES NEVER

PROBLEM SOLVING

2 Each point has been reflected in a mirror line. Write the equation of each mirror line.

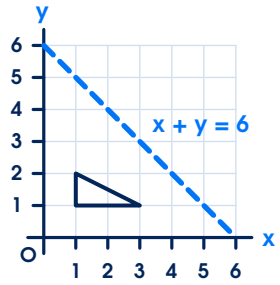
a) (1, 4) → (7, 4) ____

b) (–2, 5) → (–2, –1) ____

c) (3, –1) → (–1, 3) ____

d) (0, 6) → (–6, 0) ____

3 Use the coordinate grid.



a) Reflect the triangle in the line x + y = 6.

b) The vertex (1, 1) moves to ____

c) Find a rule: (a, b) moves to (,).

★ CHALLENGE FOR ALL

4 A point is reflected in the line x = 1, then the image is reflected in the line x = 4.

a) P(2, 3) ends up at ____

b) Q(–1, 0) ends up at ____

c) How far has each point moved? Explain why using the mirror lines.

d) Reflect in x = 1, then x = 6. How far does every point move? ____

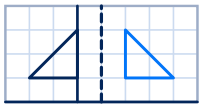
REFLECTIONS IN A LINE FROM ITS EQUATION · ANSWERS

ANSWERS

BUILDING BLOCKS

1 A (2, 3) · B (–3, 1) · C (–2, –4) · D (4, –2)
2 a) vertical, x = 2 · b) horizontal, y = 4 · c) vertical, x = –3
3 a) V · b) H · c) H · d) V
4 image vertices (4, 1), (2, 1), (2, 3)

4



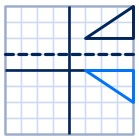
SUPPORT

1 a) x = –3 · b) y = 1 · c) vertical line through 2 on the x-axis · d) horizontal line through –2 on the y-axis
2 a) (2, 1), (0, 1), (0, 3), (1, 4) · b) (1, 0), (4, 0), (4, –2)
3 a) FALSE (x = 0 is the y-axis) · b) TRUE · c) FALSE (it is parallel to the y-axis)
4 a) (1, 2) · b) (1, 5) · c) (2, 4)

2a



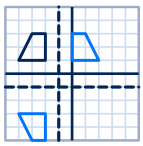
2b



CORE

1 B: (2, 1), (0, 1), (0, 3), (1, 3) · C: (–4, –3), (–2, –3), (–2, –5), (–3, –5) · c) (0, 3) · d) (–2, –5)
2 a) (3, 1), (3, 3), (4, 1) · b) (–1, –1), (–1, –3), (–3, –3)
3 (1, 2) · (–1, –2) · (–3, 2) · (–6, 0)
4 Every point on x = 4 has x-coordinate 4, e.g. (4, 0), (4, 1), (4, 5), so the line goes straight up and down: it is vertical (parallel to the y-axis). A horizontal line has an equation y = b.

1



2a



2b



GREATER DEPTH

1 a) always · b) never (only the x-coordinate changes) · c) sometimes (only if it started above y = 2; points on the line stay on it)
2 x = 4 · y = 2 · y = x · y = –x
3 a) image (5, 5), (5, 3), (4, 5) · b) (5, 5) · c) (6 – b, 6 – a)
4 a) (8, 3) · b) (5, 0) · c) 6 units to the right: twice the distance between the lines (2 × 3) · d) 10 units (2 × 5)

3

