

Reflections

Student Investigation

7 8 9 10 11 12



Introduction

Have you ever noticed how the word “Ambulance” is written on the front of the vehicle? Why is it written this way?

AMBULANCE

In this activity you will reflect points and graphs on the Cartesian plane. Three different reflections will be considered:

- y axis
- x axis
- $y = x$

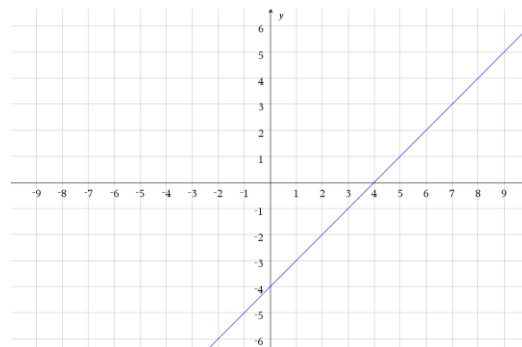


Watch the video using the QR code or short-link to help explore and answer the questions in this activity.

<https://bit.ly/reflecting-points>

Question: 1.

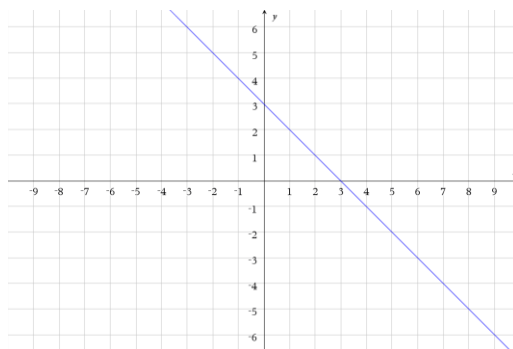
The line: $y = x - 4$ is shown opposite.



- Write down the coordinates of the x and y axes intercepts.
- The line is reflected in the y axis. Write down each of the following:
 - y axis intercept.
 - x axis intercept.
 - The equation to the reflected line.
- The line is reflected in the x axis. Write down each of the following:
 - y axis intercept.
 - x axis intercept.
 - The equation to the reflected line.
- The line is reflected in the line: $y = x$. Write down each of the following:
 - y axis intercept.
 - x axis intercept.
 - The equation to the reflected line.

Question: 2.

The line: $y = 3 - x$ is shown opposite.

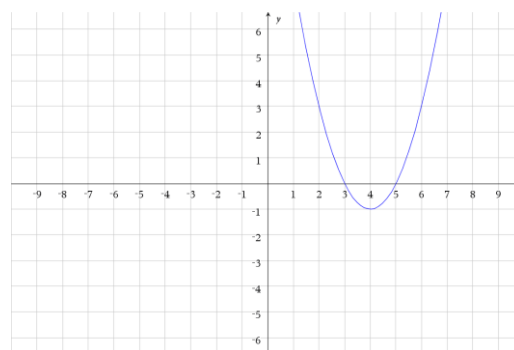


- Write down the coordinates of the x and y axes intercepts.
- The line is reflected in the y axis. Write down each of the following:
 - y axis intercept.
 - x axis intercept.
 - The equation to the reflected line.
- The line is reflected in the x axis. Write down each of the following:
 - y axis intercept.
 - x axis intercept.
 - The equation to the reflected line.
- The line is reflected in the line: $y = x$. Write down each of the following:
 - y axis intercept.
 - x axis intercept.
 - The equation to the reflected line.

DECODE
DECODE

Question: 3.

The graph of $y = x^2 - 8x + 15$ is shown opposite.



- Write down the coordinates of the x and y axes intercepts.
- The graph is reflected in the y axis. Write down each of the following:
 - y axis intercept(s).
 - x axis intercept(s).
 - The equation to the reflected graph.
- The graph is reflected in the x axis. Write down each of the following:
 - y axis intercept(s).
 - x axis intercept(s).
 - The equation to the reflected graph.
- The graph is reflected in the line: $y = x$. Write down each of the following:
 - y axis intercept(s).
 - x axis intercept.
 - The equation to the reflected graph.

Extension**Question: 4.**

A linear graph is invariant when reflected in the x axis. Determine a possible equation for such a linear function.

Question: 5.

A linear graph is invariant when reflected in the y axis. Determine a possible equation for such a linear function.

Question: 6.

The graph of $y = \frac{1}{x}$ is invariant when reflected. Determine the equation of the mirror creating the reflection.

Question: 7.

For what values of h , k and r would the graph of $(x-h)^2 + (y-k)^2 = r^2$ be invariant when reflected in the line $y = x$?

Question: 8.

The graph of $y = (x+3)^2 - 1$ is reflected in the line $x = 2$, determine the equation for the reflected function.

Question: 9.

The graph of $y = (x-h)^2$ is reflected in the line $x = n$, determine the equation for the reflected function.

Question: 10.

Explain why the graph of: $x^2 + y^2 - 2x - 2y - 2xy + 1 = 0$ would be unchanged by a reflection in the line $y = x$