



# Matching Equations & Graphs

# Refer to Section 4.4

#### Notes:

When we are given a graph and need to match it to an equation, we create tables of values based on the equations. These tables of values will give us coordinates. Which ever equation produces coordinates that equal the coordinates of the graph, is the matching equation.

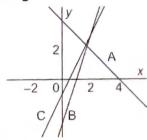
## Example:

Match each equation with a graph on this grid.

a) 
$$y = 2x - 1$$

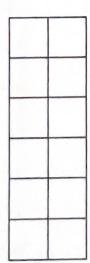
b) 
$$y = -x + 4$$

c) 
$$y = 3x - 3$$

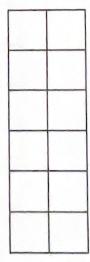


$$y = 2x - 1$$

$$y = -x + 4$$



$$y = 3x - 3$$



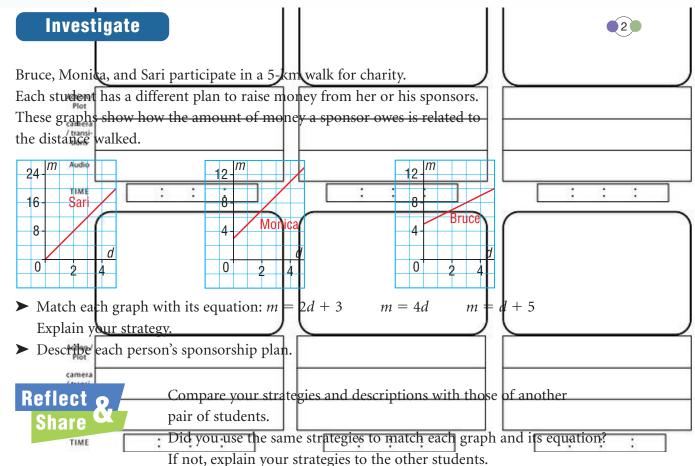


# **Matching Equations and Graphs**

#### **FOCUS**

 Match equations and graphs of linear relations.





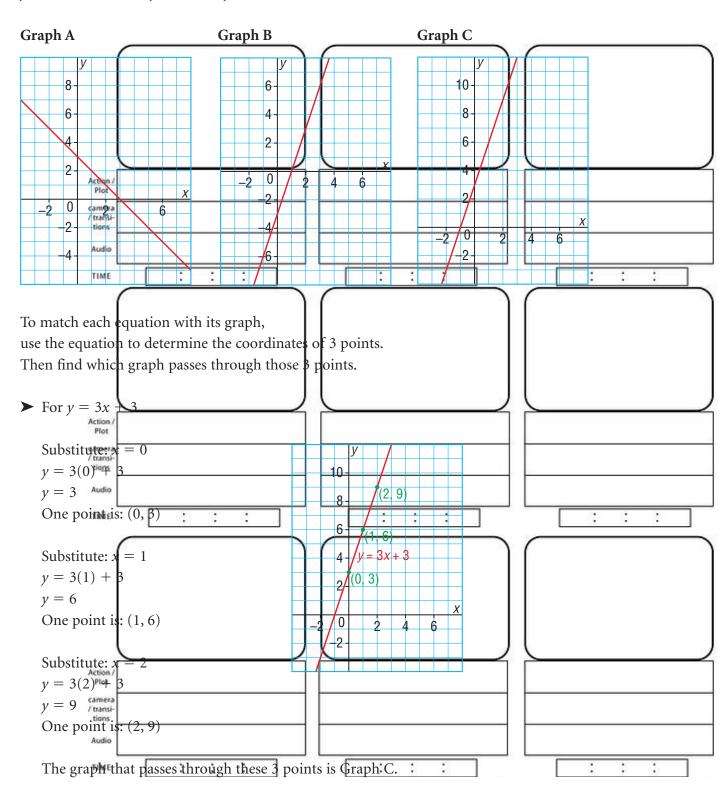
#### **Connect**

The 3 graphs below have these equations, but the graphs are not in order:

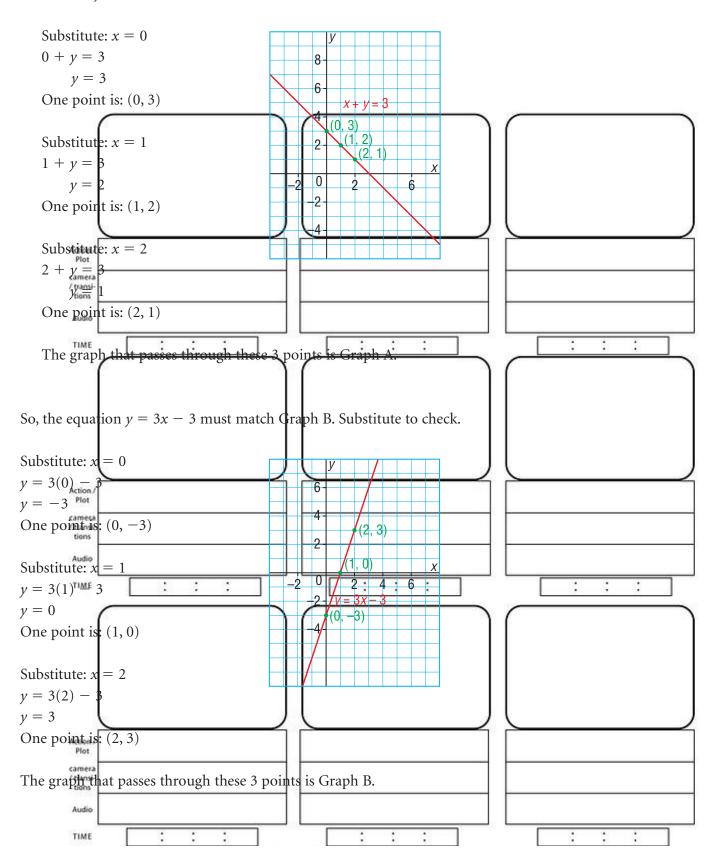
$$y = 3x + 3$$

$$x + y = 3$$

$$y = 3x - 3$$



 $\blacktriangleright$  For x + y = 3



#### Example 1

#### Matching Equations with Graphs that Pass through the Origin

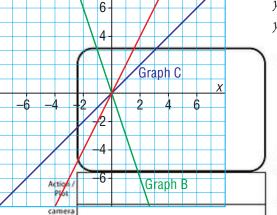
Match each graph on the grid with its equation below.

Graph A



$$y = 2x$$









# A Solution

Rewrite y = x as yThe coefficient of x represents

the pattern of

In the equation y = 1x, the 1 indicates that when x increases by 1 unit, y also increases 1 unit

This matches Graph C.

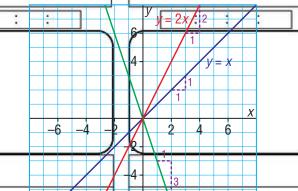
In the equation y = 2x, the 2 indicates that when x increases by 1 unit, y increases by 2 units

This matches Graph A.

In the equation y = -3x, the -3 tells us that when x increases by 1 unit, y decreases by 3 units

This matches Graph B.

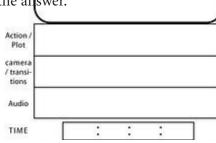
TIME

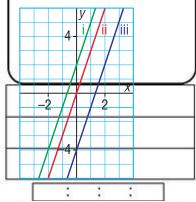


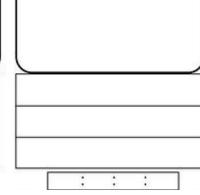


#### Example 2 Identifying a Graph Given Its Equation

Which graph on this grid has the equation y = 3x - 4? Justify the answer.

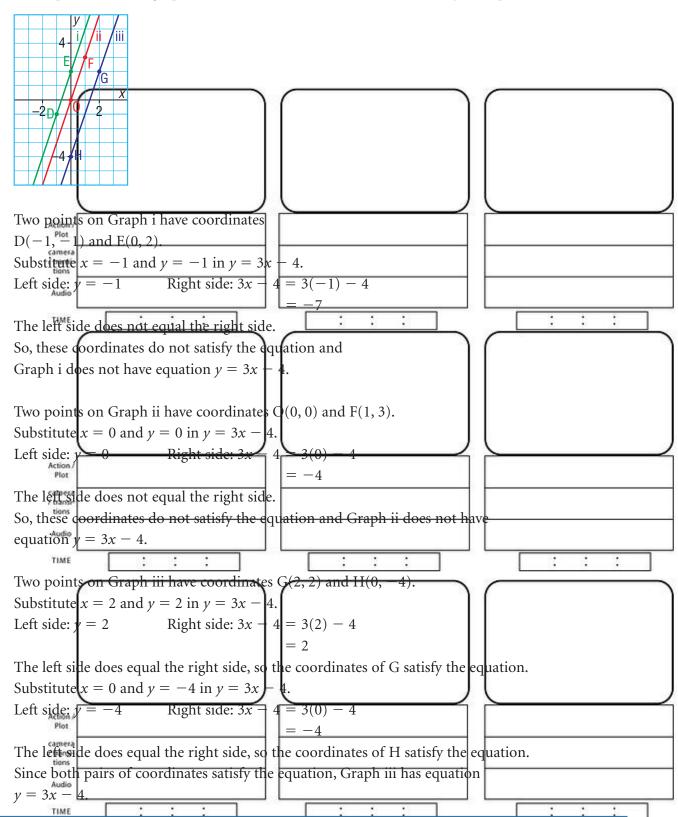






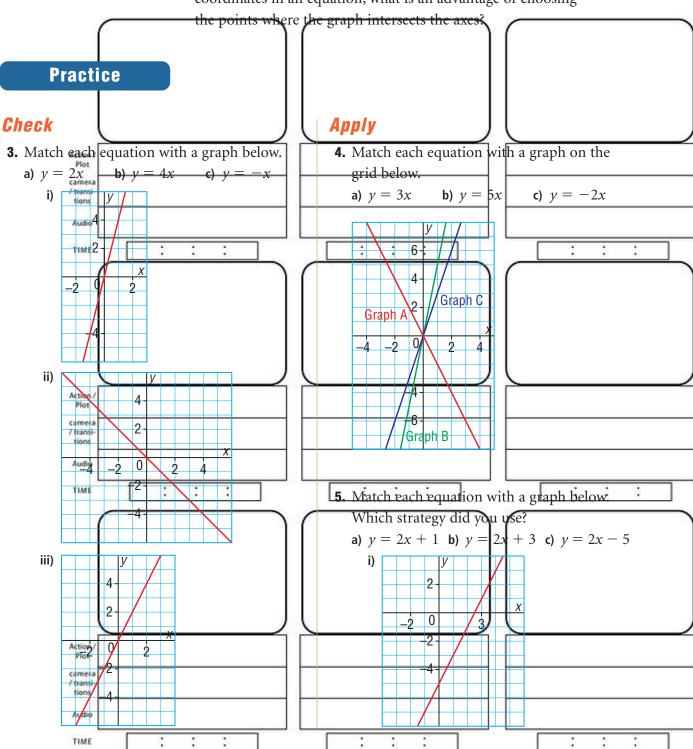
#### ► A Solution

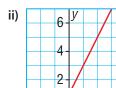
Pick 2 points on each graph and check to see if their coordinates satisfy the equation.



# Discuss the ideas

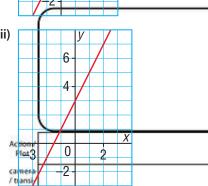
- 1. When we match an equation to a graph by determining coordinates of points on the graph, why is it helpful to check 3 points, even though 2 points are enough to identify a line?
- **2.** When we choose points on a graph to substitute their coordinates in an equation, what is an advantage of choosing





- 7. Match each equation with its graph below. Explain your strategy.
  - a) y = 2x
- **b)** 2y = 7
- c) 3y = 2





Graph C



Graph A 2

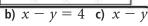
nich graph on this grid has

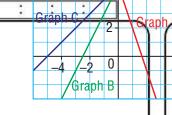
$$y = 2x + 5$$
? Justify your answer.

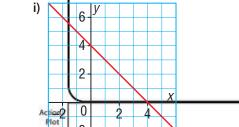
**6.** Match each equation with a graph below.

Justify your answers.

a)  $x + y \neq 4$ 





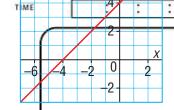


Justify your answers.

a) i) 
$$y = 2x + 1$$



iv) 
$$y = -$$



b) i) x + 3y = 1

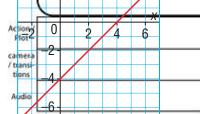
iii) 
$$3x + y = 1$$

ii) 3x - y = -3

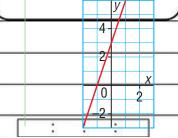
iv) 
$$3x - y = 3$$



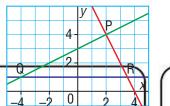
ii)



iii) 3x + y = 1

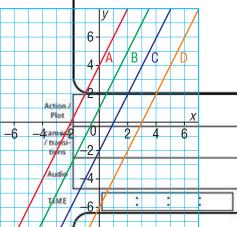


- **10.** a) Write the equations of 3 different lines.
  - **b)** Graph the lines on the same grid. Write the equations below the grid.
  - c) Trade grids with a classmate. Match your classmates' graphs and equations.
- **12.** The lines on the grid below intersect to form  $\triangle PQR$ . The equations of the lines are: y = 1, 2x + y = 8, and 2y x = 6



a) How are these 4 graphs alike?

11. Assessment Focus

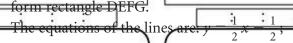


What is the equation of the line on which each side of the triangle ies?

- a) PQ
- b) QR
- c) RP

Take It Further

**13.** The lines on the grid below intersect to



y = -2x + 5; y = -2x - 8; and x - 2y = -8

- b) How are the graphs different?
- c) Match each graph to its equation.

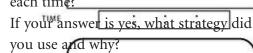
i) 
$$y = 2k - 2$$

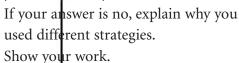
ii) 
$$y = 2x + 4$$

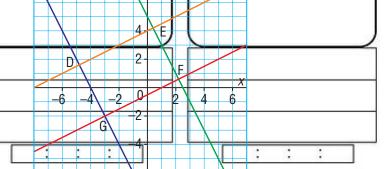
iii) 
$$2x^{\text{Plot}} y = 6$$

iv) 
$$2x^{\text{camera}}y = -1$$

d) Did you use the same strategy each time?







What is the equation of the line on which each side of the rectangle lies?

- a) DE
- b) DG
- c) EF d) FG

### Reflect

What strategies have you learned to match an equation with its graph?
When might you use each strategy? Include examples in your explanation.