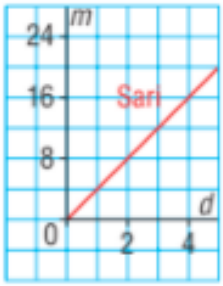
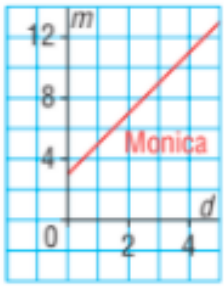
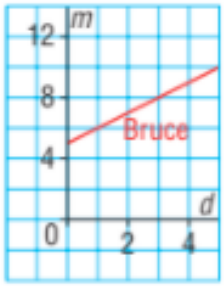
4 – Matching Equations and Graphs

Focus: Match equations and graphs of linear relations.

Bruce, Monica, and Sari participate in a 5-km walk for charity.
Each student has a different plan to raise money from her or his sponsors.
These graphs show how the amount of money a sponsor owes is related to the distance walked.







- Match each graph with its equation: $m = 2d + 3$ $m = 4d$ $m = d + 5$
  Explain your strategy.
- Describe each person's sponsorship plan.

Investigate:

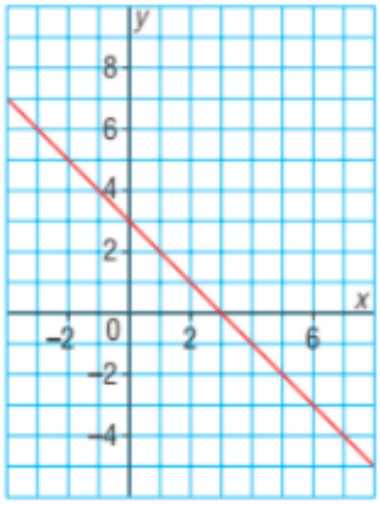
Warmup:
Do the 'investigate'.
Show any work
etc. on the right.

Look over the 'Connect'
on p. 184.
Let's look at the best way
to match an equation with
its graph.
How do you choose x
values to test?

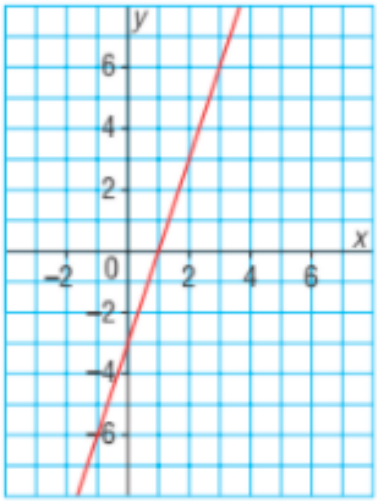
The 3 graphs below have these equations, but the graphs are not in order:

$y = 3x + 3$ $\quad x + y = 3$ $\quad y = 3x - 3$

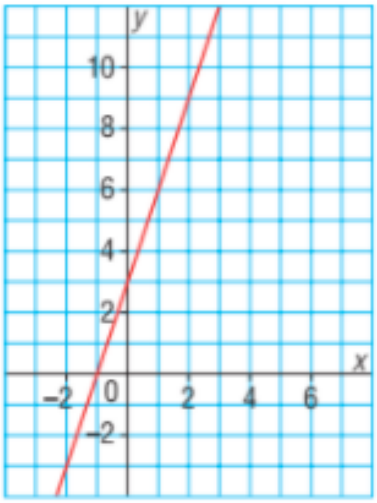
Graph A



Graph B



Graph C



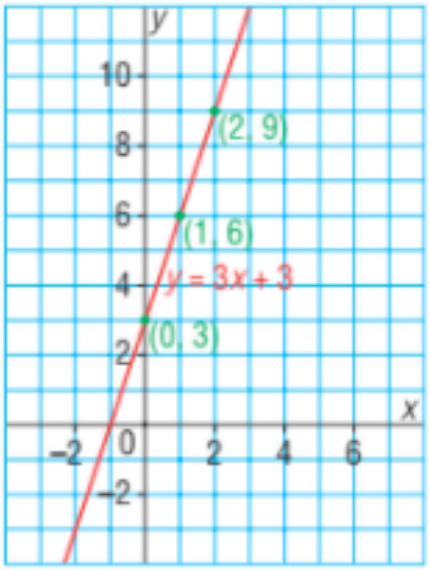
To match each equation with its graph,
use the equation to determine the coordinates of 3 points.
Then find which graph passes through those 3 points.

➤ For $y = 3x + 3$

Substitute: $x = 0$
$y = 3(0) + 3$
$y = 3$
One point is: (0, 3)

Substitute: $x = 1$
$y = 3(1) + 3$
$y = 6$
One point is: (1, 6)

Substitute: $x = 2$
$y = 3(2) + 3$
$y = 9$
One point is: (2, 9)



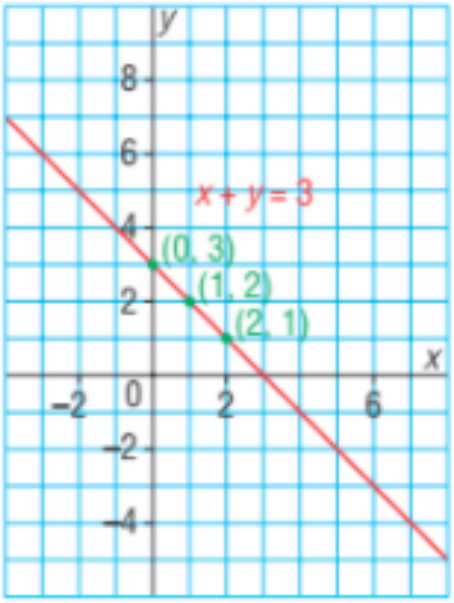
The graph that passes through these 3 points is Graph C.

➤ For $x + y = 3$

Substitute: $x = 0$
$0 + y = 3$
$y = 3$
One point is: (0, 3)

Substitute: $x = 1$
$1 + y = 3$
$y = 2$
One point is: (1, 2)

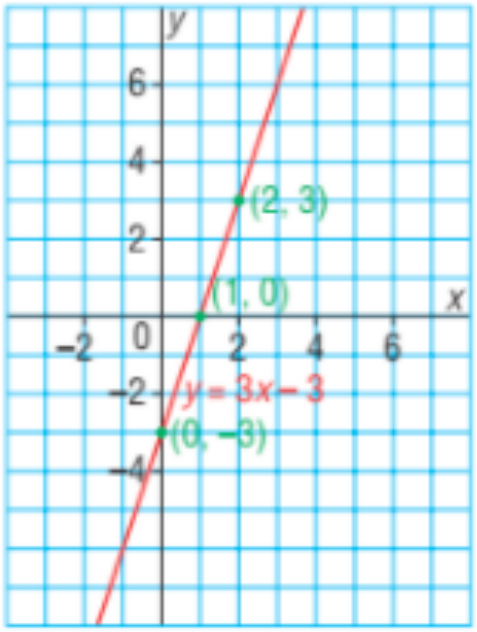
Substitute: $x = 2$
$2 + y = 3$
$y = 1$
One point is: (2, 1)



The graph that passes through these 3 points is Graph A.

So, the equation $y = 3x - 3$ must match Graph B. Substitute to check.

Substitute: $x = 0$
$y = 3(0) - 3$
$y = -3$
One point is: $(0, -3)$

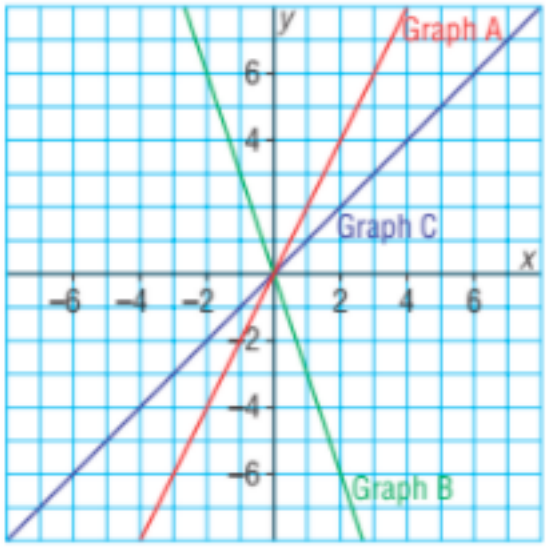


Substitute: $x = 1$
$y = 3(1) - 3$
$y = 0$
One point is: $(1, 0)$

Substitute: $x = 2$
$y = 3(2) - 3$
$y = 3$
One point is: $(2, 3)$

The graph that passes through these 3 points is Graph B.

Match each graph on the grid with its equation below.



$y = x$

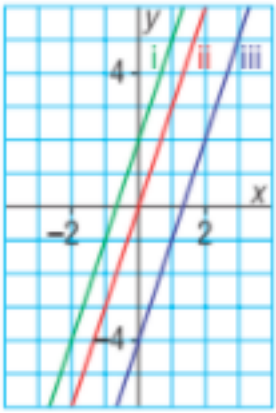
$y = 2x$

$y = -3x$

Ex1 Why is testing x = 0 unhelpful on the graph to the right?

Ex 2

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



When all lines cross the *y* axis at a different point, why is it smart to test x = 0 into the equation(s)?