LINES OF THE FORM y = mx

BUILDING BLOCKS

NAME _____ CLASS _____ DATE _____

KEY IDEA

y = 3x means y is 3 times x.

When x = 2: y = 3 × 2 = 6

Every value of x is multiplied by the same number.

2	2	2

3 lots of 2 = 6

1 When x = 4, work out each value.

2x = ☐ **5x =** ☐ **10x =** ☐ **3x =** ☐

2 Complete the table of values for y = 2x

x	0	1	2	3	4
y	0	☐	☐	☐	☐

Hint: 2x means 2 lots of x.

3	3

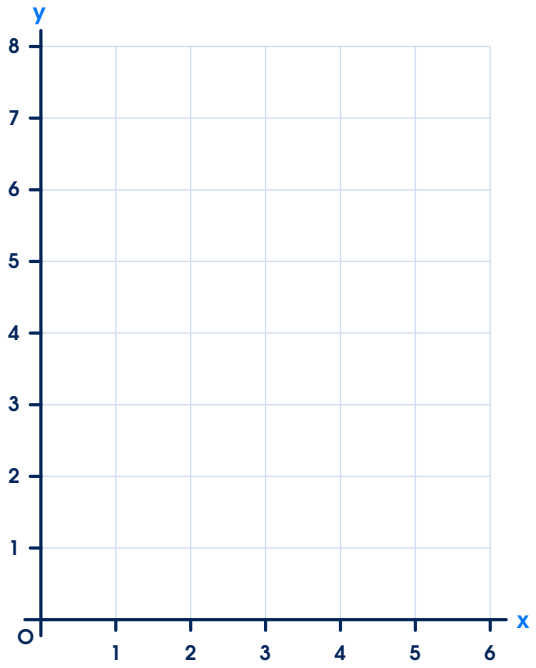
x = 3: 3 + 3 = 6

3 Draw the line y = 2x

Plot the points from your table in question 2. Then join them with a ruler.

The line goes through the corner (0, 0).

Is the line straight? YES NO



4 Tick the points where y is 2 times x.

(3, 6) ☐ **(6, 3)** ☐ **(4, 8)** ☐

(5, 7) ☐ **(1, 2)** ☐ **(0, 0)** ☐

LINES OF THE FORM y = mx

SUPPORT

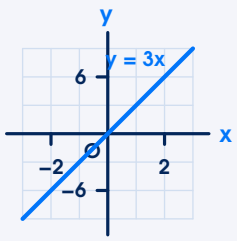
NAME _____ CLASS _____ DATE _____

KEY IDEA

y = 3x: the y-value is 3 times the x-value.

x	–2	–1	0	1	2
y	–6	–3	0	3	6

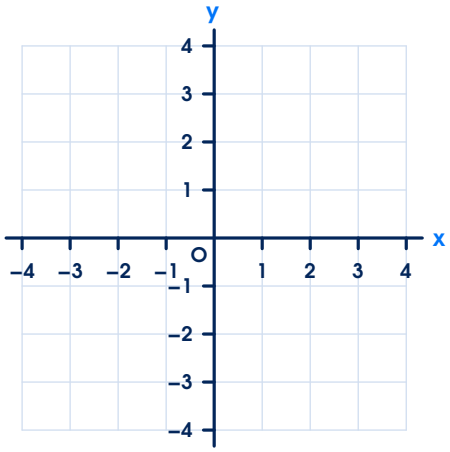
Every line y = mx goes through the origin (0, 0).



1 a) Complete the table of values for y = 2x

x	–2	–1	0	1	2
y					

b) Plot the points and draw the line y = 2x.
Extend it to the edges of the grid.



2 Match each line to its equation.

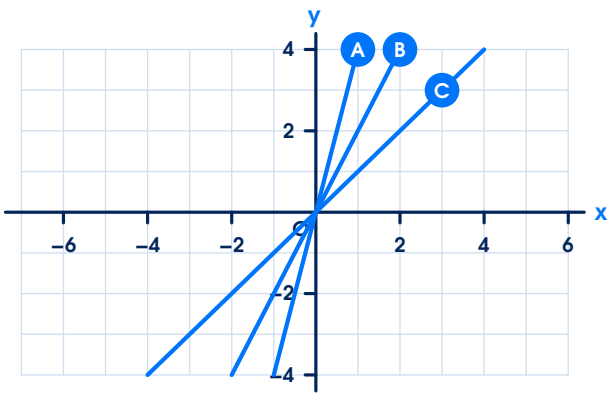
y = x **y = 2x** **y = 4x**

Line A is ____

Line B is ____

Line C is ____

The bigger the number, the steeper the line.



3 Which points lie on the line y = 3x? Tick them.

(5, 15) ☐ **(2, 5)** ☐ **(–1, –3)** ☐ **(10, 30)** ☐ **(4, 7)** ☐ **(0, 0)** ☐

4 The equation of a line is y = 5x. Complete these.

When x = 4, y = ____ When x = –2, y = ____ When y = 35, x = ____

LINES OF THE FORM y = mx

CORE

NAME _____ CLASS _____ DATE _____

KEY IDEA

y = mx: y is m times x. Every line y = mx goes through (0, 0). The bigger m is, the steeper the line.

FLUENCY

1 Complete each table of values.

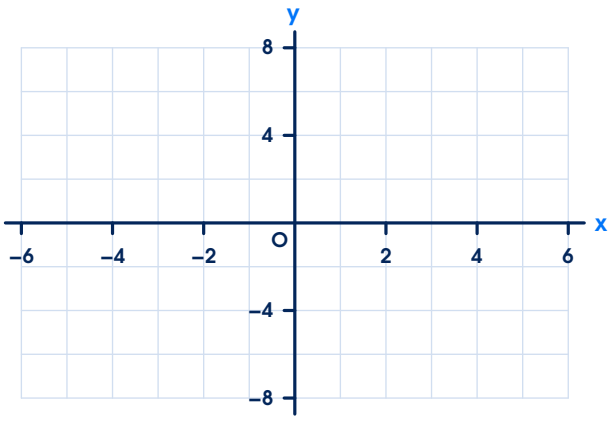
Then draw both lines on the grid and label them.

a) $y = 3x$

x	−2	−1	0	1	2
y					

b) $y = \frac{1}{2}x$

x	−4	−2	0	2	4
y					



REASONING

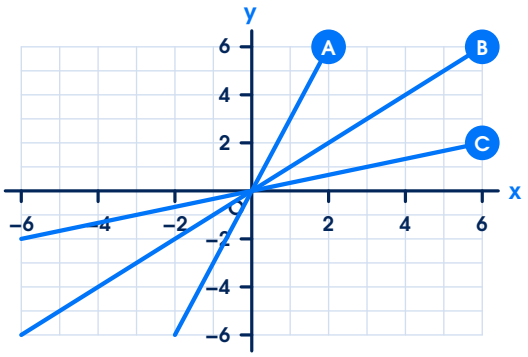
2 Write the equation of each line.

Line A _____

Line B _____

Line C _____

Read a point with whole-number coordinates on each line.



3 Mo says, "The line y = 5x cannot go through the origin." Explain why Mo is wrong.

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4 What is the same and what is different about the lines y = 2x and y = 6x?

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LINES OF THE FORM y = mx

GREATER DEPTH

NAME _____ CLASS _____ DATE _____

REASONING

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

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

a) The line y = mx passes through the point (1, m). ALWAYS SOMETIMES NEVER

b) The line y = mx is steeper than the line y = x. ALWAYS SOMETIMES NEVER

c) The line y = mx passes through the point (2, 3). ALWAYS SOMETIMES NEVER

d) The line y = mx passes through the origin. ALWAYS SOMETIMES NEVER

PROBLEM SOLVING

2 The point (4, 10) lies on the line y = mx.

a) Find m. ☐ **b)** Find y when x = –6. ☐

c) Find x when y = 35. ☐

3 Write the lines in order, from least steep to steepest.

y = 3x | y = ½x | y = 10x | y = x | y = 1.5x

☐ → ☐ → ☐ → ☐ → ☐

least steep steepest

★ CHALLENGE FOR ALL

4 The line y = mx passes through (3, 12), (k, 20) and (–2, h).

a) Find m. ☐ **b)** Find k. ☐ **c)** Find h. ☐

d) Does the point (0.5, 2) lie on the line? Show how you know. ☐

LINES OF THE FORM y = mx

ANSWERS

BUILDING BLOCKS

1 8 · 20 · 40 · 12
2 0, 2, 4, 6, 8
3 Points (0, 0), (1, 2), (2, 4), (3, 6), (4, 8) joined with a straight line · yes
4 Tick (3, 6), (4, 8), (1, 2) and (0, 0)

SUPPORT

1 a) –4, –2, 0, 2, 4 · b) straight line through the origin from (–3, –6) to (3, 6)
2 A y = 4x · B y = 2x · C y = x
3 Tick (5, 15), (–1, –3), (10, 30) and (0, 0)
4 20 · –10 · 7

CORE

1 a) –6, –3, 0, 3, 6 · b) –2, –1, 0, 1, 2 · both lines drawn through the origin, y = 3x much steeper
2 A y = 3x · B y = x · C y = (1/3)x
3 When x = 0, y = 5 × 0 = 0, so (0, 0) is on the line.
4 Same: both straight lines through the origin, both slope upwards. Different: y = 6x is steeper (y is 6 times x rather than 2 times x).

GREATER DEPTH

1 a) Always: y = m × 1 = m · b) Sometimes: true for m = 3, false for m = ½ · c) Sometimes: only when m = 1.5 · d) Always
2 a) m = 2.5 · b) –15 · c) 14
3 y = ½x, y = x, y = 1.5x, y = 3x, y = 10x
4 a) m = 4 · b) k = 5 · c) h = –8 · d) Yes: 4 × 0.5 = 2