LESSON MAKER PRO

Line or Curve?

Use equations, values, and graphs to identify linear functions.

GRADE 8 · 8.F.A.3

CCSS.Math.Content.8.F.A.3 "Interpret the equation y = mx + b as defining a linear function, whose graph is a straight line; give examples of functions that are not linear. For example..."

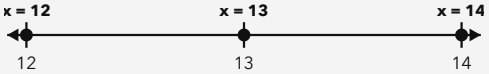
NAME _____ DATE _____

STRAIGHT-LINE RULE

A function is linear when it has a constant rate of change. An equation y = mx + b is linear, and its graph is a straight line. A rule with x^2 is not linear because its rate of change changes.

WORKED EXAMPLE

Use the marked inputs to test y = 10x - 11. Is the function linear?



1. For x = 12, y = 10(12) - 11 = 109.
2. For x = 13, y = 10(13) - 11 = 119.
3. For x = 14, y = 10(14) - 11 = 129.
4. The output rises by 10 each time, so the graph is a straight line.

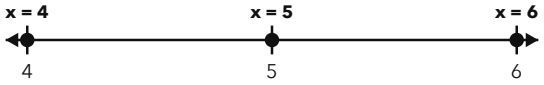
Answer: Yes. The points are (12,109), (13,119), and (14,129).

PRACTICE 4 problems

1 For y = -4x + 6, name m and b. Is the function linear?

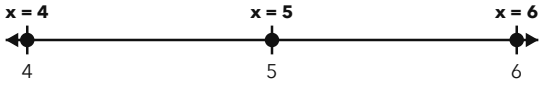
ANSWER _____

2 Use the marked input x = 6 in y = 5x - 7. Find y. Is the function linear?



ANSWER _____

3 Use the marked inputs in $y = x^2$. List the outputs. Do they have a constant change?



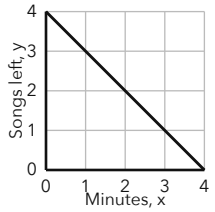
ANSWER _____

4 Which function is not linear? Explain. A: y = -6x + 4 B: $y = x^2 + 4$

ANSWER _____

APPLY IT Show your work

1 Jules has songs downloading. The graph shows y, the number of songs left after x minutes. Write an equation for the graph. Is it linear?



ANSWER _____

2 An online shop makes square stickers. A sticker has side length x cm and area $y = x^2$ cm^2. Find y when x = 4 and when x = 6. Is this function linear?

WORK SPACE

ANSWER _____

CHALLENGE One step up

Function R has points (3,1), (5,5), and (7,9). Function S has points (3,9), (5,25), and (7,49). Which function is linear? Write its equation and explain why the other function is not linear.

WORK SPACE AND ANSWER

ANSWER KEY

Line or Curve?

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PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	For y = -4x + 6, name m and b. Is the function linear?	**m = -4, b = 6; yes, it is linear.**
2	Use the marked input x = 6 in y = 5x - 7. Find y. Is the function linear?	**y = 23; yes, it is linear.**
3	Use the marked inputs in $y = x^2$. List the outputs. Do they have a constant change?	**16, 25, 36; no, the changes are 9 and 11.**
4	Which function is not linear? Explain. A: y = -6x + 4 B: $y = x^2 + 4$	**B is not linear because x is squared, so the rate of change is not constant.**

PART 2 · APPLY IT

1. **y = -x + 4; yes, it is linear.** The line crosses the y-axis at 4 and falls 1 song for each minute. A straight graph represents a linear function.
2. **y = 16 and y = 36; no, it is not linear.** Substitute 4 and 6 into $y = x^2$. The squared rule does not have a constant rate of change.

CHALLENGE

R is linear: y = 2x - 5. Its y-values rise by 4 when x rises by 2. S is not linear because its y-value changes are 16 and 24, not constant.

Accept equivalent statements such as "constant rate of change" or "straight line" for linear. For the challenge, accept a correct explanation that S follows $y = x^2$.