

Review



REVIEW

Topic 4 Introduction to Functions

Review

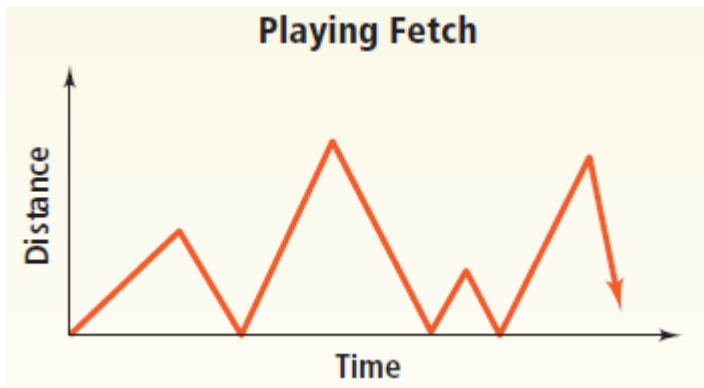


Quick Review

You can use graphs to represent the relationship between two variables.

Example

A dog owner plays fetch with her dog. Sketch a graph to represent the distance between them and the time.



Exercises

1. **Travel** A car's speed increases as it merges onto a highway. The car travels at 65 mi/h on the highway until it slows to exit. The car then stops at three traffic lights before reaching its destination. Draw a sketch of a graph that shows the car's speed over time. Label each section.
2. **Surfing** A professional surfer paddles out past breaking waves, rides a wave, paddles back out past the breaking waves, rides another wave, and paddles back to the beach. Draw a sketch of a graph that shows the surfer's possible distance from the beach over time.

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Quick Review

A function is a relationship that pairs each input value with exactly one output value. A linear function is a function whose graph is a line or part of a line.

Example

The number y of eggs left in a dozen depends on the number x of 2-egg omelets you make, as shown in the table. Represent this relationship using words, an equation, and a graph.

Number of Omelets Made, x	0	1	2	3
Number of Eggs Left, y	12	10	8	6

Look for a pattern in the table. Each time x increases by 1, y decreases by 2. The number y of eggs left is 12 minus the quantity 2 times the number x of omelets made: $y = 12 - 2x$.

Exercises

For each table, identify the independent and dependent variables. Represent the relationship using words, an equation, and a graph.

3. Paint in Can

Number of Chairs Painted, p	Paint Left (oz), L
0	128
1	98
2	68
3	38

4. Game Cost

Number of Snacks Purchased, s	Total Cost, C
0	\$18
1	\$21
2	\$24
3	\$27

5. Elevation

Number of Flights of Stairs Climbed, n	0	1	2	3
Elevation (ft above sea level), E	311	326	341	356

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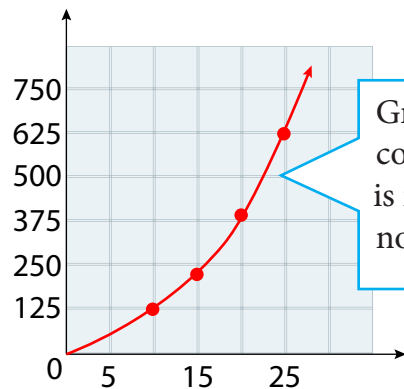
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A nonlinear function is a function whose graph is not a line or part of a line.

Example

The area A of a square field is a function of the side length s of the field. Is the function linear or nonlinear?

Side Length (ft), s	10	15	20	25
Area (ft ²), A	100	225	400	625



Graph the ordered pairs and connect the points. The graph is not a line, so the function is nonlinear.

Exercises

Graph the function shown by each table. Tell whether the function is linear or nonlinear.

6.

X	Y
1	0
2	1
3	8
4	20

7.

X	Y
1	0
2	4.5
3	9
4	13.5

8.

X	Y
1	2
2	6
3	12
4	72

9.

X	Y
1	-2
2	-9
3	-16
4	-23

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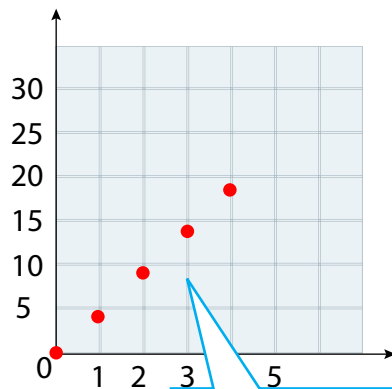
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A continuous graph is a graph that is unbroken. A discrete graph is composed of distinct, isolated points. In a realworld graph, show only points that make sense.

Example

The total height h of a stack of cans is a function of the number n of layers of 4.5-in. cans used. This situation is represented by $h = 4.5n$. Graph the function.

n	h
0	0
1	4.5
2	9
3	13.5
4	18



Graph the ordered pairs and connect the points. The graph is not a line, so the function is nonlinear.

Exercises

Graph the function rule. Explain why the graph is continuous or discrete.

10. **Walnuts** Your cost c to buy w pounds of walnuts at \$6/lb is represented by $c = 6w$.

11. **Moving** A truck originally held 24 chairs. You remove 2 chairs at a time. The number of chairs n remaining after you make t trips is represented by $n = 24 - 2t$.

12. **Flood** A burst pipe fills a basement with 37 in. of water. A pump empties the water at a rate of 1.5 in./h. The water level l , in inches, after t hours is represented by $l = 37 - 1.5t$.

13. Graph $y = -|x| + 2$.

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Quick Review

To write a function rule describing a real-world situation, it is often helpful to start with a verbal model of the situation.

Example

At a bicycle motocross (BMX) track, you pay \$40 for a racing license plus \$15 per race. What is a function rule that represents your total cost?

total cost = license fee + fee per race * # number of
races

$$C = 40 + 15 \cdot r$$

A function rule is $C = 40 + 15 \cdot r$.

Exercises

Write a function rule to represent each situation.

14. **Landscaping** The volume V remaining in a 243-ft³ pile of gravel decreases by 0.2 ft³ with each shovelful s of gravel spread in a walkway.

15. **Design** Your total cost C for hiring a garden designer is \$200 for an initial consultation plus \$45 for each hour h the designer spends drawing plans.

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Quick Review

A relation pairs numbers in the domain with numbers in the range. A relation may or may not be a function.

Example

Is the relation $\{(0, 1), (3, 3), (4, 4), (0, 0)\}$ a function?

The x-values of the ordered pairs form the domain, and the y-values form the range. The domain value 0 is paired with two range values, 1 and 0. So the relation is not a function.

Exercises

Tell whether each relation is a function.

16. $\{(-1, 7), (9, 4), (3, -2), (5, 3), (9, 1)\}$

17. $\{(2, 5), (3, 5), (4, -4), (5, -4), (6, 8)\}$

Evaluate each function for $x = 2$ and $x = 7$.

18. $f(x) = 2x - 8$

19. $h(x) = -4x + 61$

