

Introduction to Functions: math practice, Grade 8 – download the PDF

22 problems graded by difficulty (★ easy, ★★ medium, ★★★ hard). Try first, without looking at the solutions!

1 Function or not?

★ ★ ★

Decide whether each set of ordered pairs is a function. Explain.

- a. $\{(1, 4), (2, 7), (3, 4), (4, 9)\}$
- b. $\{(2, 1), (2, 5), (3, 6)\}$

2 Running a machine

★ ★ ★

A machine uses the rule $y = 4x - 3$. Find the output for the inputs 0, 2, 5 and -1 .

3 Completing a table

★ ★ ★

Complete the table for $y = -2x + 6$ with inputs $-1, 0, 1, 3$.

4 Rate and initial value



Give the rate of change and the initial value of each function.

a. $y = 5x + 12$

b. $y = -3x + 9$

c. $y = 0.5x$

5 True or false?



True or false? Justify each answer.

a. An input of a function can have two different outputs.

b. Two different inputs can have the same output.

c. The graph of $y = x^2$ is a straight line.

6 Is the change constant?



Look at this table. Is the function linear? If yes, find the rate of change.

x	0	1	2	3
y	7	10	13	16

7 A circle on the grid



The circle $x^2 + y^2 = 25$ passes through the points $(3, 4)$ and $(3, -4)$. Is the circle the graph of a function? Name the test you use.

8

Taxi fare

A taxi charges a flat fee of 3 dollars plus 2 dollars for each mile. Let m be the number of miles and C the cost in dollars.

- Write an equation for C .
- How much does a 6-mile ride cost?
- A ride costs 27 dollars. How long is it?

9

Equation from two points

A linear function passes through $(2, 7)$ and $(6, 19)$. Find its rate of change, its initial value and its equation.

10

Linear or nonlinear?

Classify each function as linear or nonlinear.

- $y = 3x - 5$
- $y = x^2 + 1$
- $y = 7$
- $y = x^3$

11 Which function is greater?



Function f is given by the table below. Function g is given by $g(x) = 4x - 1$.

x	0	1	2	3
$f(x)$	2	5	8	11

- Find the rate of change and initial value of each function.
- Which function has the greater value at $x = 5$?

12 Draining a tank



A water tank holds 80 gallons. It drains at a constant 5 gallons per minute. Let t be the time in minutes and V the volume in gallons.

- Write an equation for V .
- What do -5 and 80 mean in this situation?
- When is the tank empty?

13 Phone battery



A phone battery shows 100% at hour 0, 84% at hour 2 and 68% at hour 4. Assume the drop is linear.

- Find the rate of change and write the equation.
- After how many hours does the battery reach 0%?

14 Temperature conversion



The rule $F = 1.8C + 32$ converts degrees Celsius to degrees Fahrenheit.

- Convert 0°C , 25°C and 100°C .
- Give the rate of change and the initial value. Is the function linear?

15 Cyclist's trip



A cyclist rides at a constant speed of 12 miles per hour for half an hour. She then rests for half an hour. Finally she rides for one more hour at 8 miles per hour. Sketch the graph of her distance (in miles) against the time (in hours), and list the coordinates where the graph changes direction.

16 A table that fails



A student claims this table shows a function.

x	1	2	2	3
y	3	5	6	8

Is the student right? How could you change one value to make it a function?

17 Two gym plans



Plan A costs $12 + 18x$ dollars after x months. Plan B costs $40 + 10x$ dollars.

- Which plan costs less after 3 months? After 4 months?
- Solve $12 + 18x = 40 + 10x$. What does the solution tell you?

18 Error analysis



A student says: “The outputs of $y = x^2$ keep increasing, so it has a constant rate of change.” Use a table with $x = 1, 2, 3, 4$ to explain the error.

19 Equation from a graph



The graph of a linear function passes through $(0, -2)$ and $(4, 6)$.

- Find its equation.
- At what value of x does the graph cross the x -axis?

20 A burning candle



A candle is 12 inches tall and burns down 1.5 inches per hour. Let t be the number of hours and h the height in inches.

- Write h as a function of t .
- How tall is it after 5 hours?
- For which values of t does the function make sense?

21 Area of a square



The area of a square of side s inches is $A = s^2$.

- Is A a function of s ? Is it linear?
- Complete: side 3 gives area ?, side 6 gives area ?. What happens to the area when the side doubles?

22

Missing coefficients

A linear function $f(x) = ax + b$ satisfies $f(0) = 5$ and $f(4) = 17$. Find a and b , then compute $f(10)$ and find x when $f(x) = 50$.

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