

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

Suggested time: 45 minutes. Out of 20 points. Calculator allowed only when the problem says so.

1 Function or not?

/ 4 pts

- a. Is $\{(0, 3), (1, 5), (2, 3), (3, 7)\}$ a function?
- b. Is $\{(4, 1), (4, 2), (5, 3)\}$ a function?
- c. A graph contains the points $(2, 5)$ and $(2, -1)$. Can it be the graph of a function?
- d. Is the rule “the output is the square of the input” a function?

2 Reading a table

/ 4 pts

A linear function is given by this table.

x	0	2	4	6
y	5	11	17	23

- Find the rate of change.
- Give the initial value.
- Write the equation.
- Compute the output for $x = 10$.

3 Linear or nonlinear?

/ 3 pts

Classify each as linear or nonlinear and justify briefly.

- $y = 0.5x - 3$
- $y = x^3$
- $x = 1, 2, 3, 4$ gives $y = 2, 4, 8, 16$

4 A swimming pool

/ 4 pts

A pool holds 600 gallons of water and drains at a constant 25 gallons per minute. Let t be the time in minutes and V the volume in gallons.

- Write an equation for V .
- Explain what 600 and -25 mean.
- How much water is left after 10 minutes?
- When is the pool empty?

5 Comparing two functions

/ 3 pts

Function f is $f(x) = 4x + 3$. Function g is linear and its graph passes through $(0, 9)$ and $(3, 15)$.

- Find the rate of change of each function.
- Which function has the greater initial value?
- For which value of x are the two outputs equal?

6 Sketch from a story

/ 2 pts

A drone climbs steadily from the ground to 60 feet in 10 seconds. It hovers for 5 seconds. Then it descends steadily to the ground in 10 seconds. Sketch the graph of the height (in feet) against the time (in seconds) and give the three key points after the start.



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