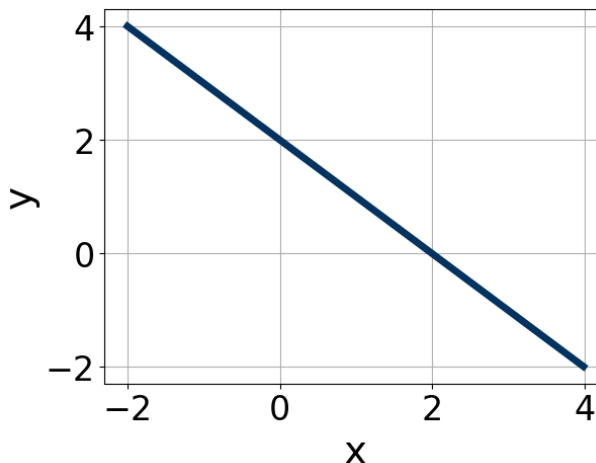


This key should allow you to understand why you choose the option you did (beyond just getting a question right or wrong). More instructions on how to use this key can be found [here](#).

If you have a suggestion to make the keys better, please fill out the short survey [here](#).

*Note: This key is auto-generated and may contain issues and/or errors. The keys are reviewed after each exam to ensure grading is done accurately. If there are issues (like duplicate options), they are noted in the offline gradebook. The keys are a work-in-progress to give students as many resources to improve as possible.*

1. Is the graph below a linear function?



The solution is yes, the graph is linear., which is option A.

- A. Yes, the graph is linear

\* Correct! The graph has a constant rate of change and is thus a linear function.

- B. No, the graph is not linear.

A linear function has a constant rate of growth. As  $x$  increases/decreases,  $y$  increases/decreases at the same rate. The graph in this example does have a constant rate of change.

**General Comment:** The equation graphed was  $-1(x - 1) + 1$ . A linear function has a constant rate of growth. This means that as  $x$  increases or decreases,  $y$  increase or decreases at the same rate. For example,  $x^2$  is NOT a linear function. As  $x$  increases, the  $y$  increases faster and faster. From  $x = 1$  to  $x = 2$ , the  $y$  increases by 3. From  $x = 2$  to  $x = 3$ , the  $y$  increases by 5. From  $x = 3$  to  $x = 4$ , the  $y$  increases by 7. A linear function would have the same change in  $y$  for any change in  $x$ .

2. Is the following relation a function?

x	y
2	-16
3	-54
4	-128
5	-250
6	-432
7	-686
8	-1024

The solution is Yes, which is option A.

- A. Yes

\* Correct! Every  $x$ -value has exactly one output.

B. No

For a relation to be a function, every  $x$ -value needs exactly one output. That means for a relation to NOT be a function, we would need one  $x$ -value that has two or more different outputs.

**General Comment:** For a relation to be a function, every  $x$ -value needs exactly one output.

---

3. Is the equation below a linear function?

$$f(x) = 3(x + 5) - 5$$

The solution is yes, the graph is linear., which is option A.

A. Yes, the equation is linear

\* Correct! The equation is a degree-1 polynomial and is thus a linear function.

B. No, the equation is not linear.

A linear function is a degree-1 polynomial. Polynomial equations have all variables with positive integer exponents.

**General Comment:** The equation graphed was  $3(x + 5) - 5$ . A linear function is a degree-1 polynomial. Polynomial equations have all variables with positive integer exponents, like  $f(x) = 3x^2 - 2x + 4$ . Square root and cube root functions have rational exponents ( $1/2$  and  $1/3$ ).

---

4. Is the following relation a linear function?

x	y
1	2.0
2	2.83
3	3.46
4	4.0
5	4.47
6	4.9
7	5.29

The solution is No, which is option B.

A. Yes

A linear function has a constant rate of growth. As  $x$  increases/decreases,  $y$  increases/decreases at the same rate. The table in this example does have a constant rate of change.

B. No

\* Correct! The table in this example does not have a constant rate of change. This relation is a float function.

**General Comment:** For a relation to be a linear function, every  $x$ -value needs exactly one output AND there needs to be a constant rate of growth (as  $x$  increases/decreases,  $y$  increases/decreases at the same rate).

---