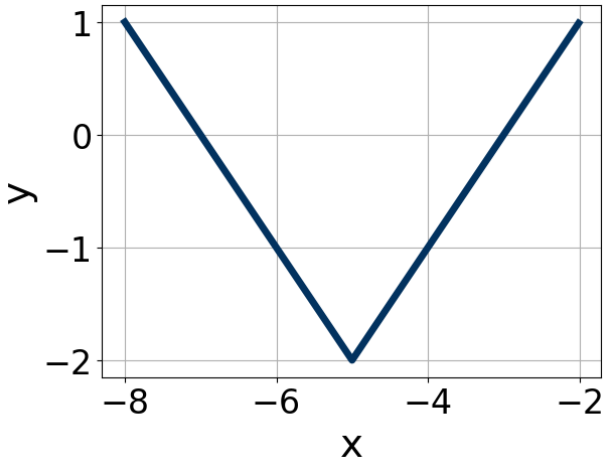
This key should allow you to understand why you choose the option you did (beyond just getting a question right or wrong). More instructions on how to use this key can be found here.

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 no, the graph is not linear., which is option B.

A. Yes, the graph is 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 not have a constant rate of change.

B. No, the graph is not linear.

* Correct! The graph does not have a constant rate of change and thus is not a linear function.

General Comment: The equation graphed was 1—x + 5—-2. 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	1.26
3	1.44
4	1.59
5	1.71
6	1.82
7	1.91
8	2.0

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?

$$f(x) = -3(x+3)^4 + 1$$

The solution is no, the equation is not linear., which is option B.

A. Yes, the equation is linear

A linear equation is a degree-1 polynomial. -3(x + 3)^4+1$isadegree-4polynomialNo, theequationisnotlinear.$

* Correct! -3(x + 3)^4 + 1$isnotadegree - 1polynomial.$

General Comment: The equation graphed was -3(x + 3)^4+1.$Alinearfunctionisadegree-1polynomial.Polynomialeq$ = 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
2	-4.24
3	-5.2
4	-6.0
5	-6.71
6	-6.71
5	4.24
4	5.2

The solution is No, which is option B.

A. Yes

Notice how one x-value has two separate outputs? For a relation to be a function, every x-value needs exactly one output.

B. No

* Correct! An x-value has two separate outputs and thus this relation is not a function, let alone a linear 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).
