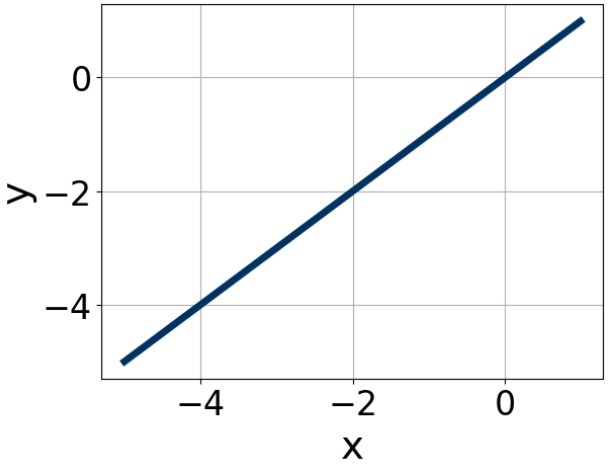
This key should allow you to understand why you choose the option you did (beyond just getting a question right or wrong). More instructions on how to use this key can be found here.

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 + 2)-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
1	4.0
2	8.0
3	16.0
4	32.0
5	64.0
6	128.0
7	256.0

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?

$$f(x) = -2(x + 5) + 2$$

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 -2(x + 5)+2. 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	-3
2	-6
3	-9
4	9
3	3
2	6
1	9

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.

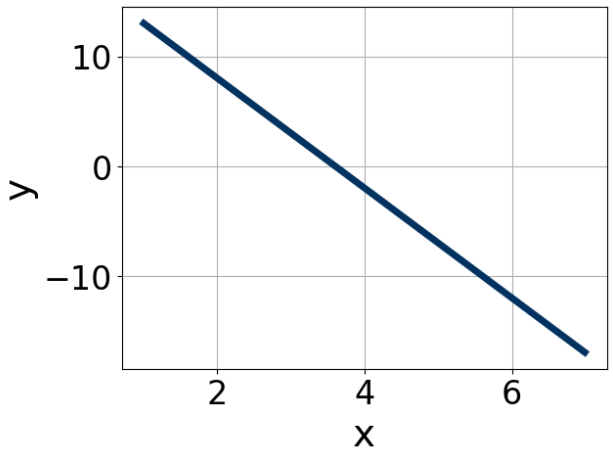
B. No

* 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).

---

5. 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 -5(x -4)-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.

---

6. Is the following relation a function?

$$(-3, 135), (-2, 40), (-1, 5), (0, 0), (1, -5), (2, -40), (3, -135)$$

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.

---

7. Is the equation below a linear function?

$$f(x) = 4\sqrt{3x - 7} + 7$$

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. $4\sqrt{3x-7}+7 is a square root function No, the equation is not linear.$

* Correct! $4\sqrt{3x-7}+7 is not a degree-1 polynomial.$

General Comment: The equation graphed was $4\sqrt{3x-7}+7. A linear function is a degree-1 polynomial. Polynomial equ$
$= 3x^2 - 2x + 4$. Square root and cube root functions have rational exponents (1/2 and 1/3).

---

8. Is the following relation a linear function?

x	y
1	-3
2	-12
3	-27
4	-48
5	48
4	3
3	12

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.

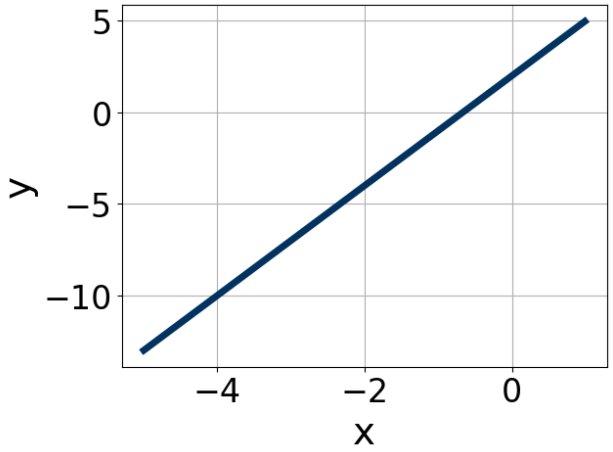
B. No

* 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).

---

9. 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 3(x + 2)-4. 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.

---

10. Is the following relation a function?

x	y
-1	1
0	0
1	-1
2	-8
3	-27
4	-64
5	-125

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.

---

11. Is the equation below a linear function?

$$f(x) = 4(2)^{x+5} - 3$$

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. $4\,(2)^{x+5} - 3 is a base - 2 exponential function No, the equation is not linear.$

* Correct! $4\,(2)^{x+5} - 3 is not a degree - 1 polynomial.$

General Comment: The equation graphed was $4\,(2)^{x+5} - 3. A linear function is a degree - 1 polynomial. Polynomial equ$
$= 3x^2 - 2x + 4$. Square root and cube root functions have rational exponents (1/2 and 1/3).

---

12. Is the following relation a linear function?

x	y
3	-3.46
4	-4.0
5	-4.0
4	3.46
3	4.0
2	4.47
1	4.9

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.

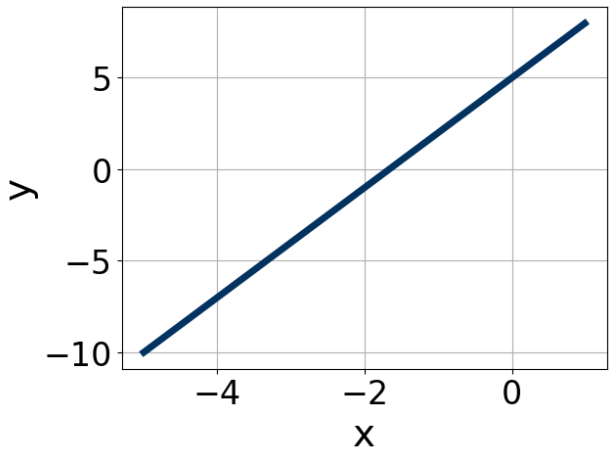
B. No

* 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).

---

13. 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 3(x + 2)-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.

---

14. Is the following relation a function?

$$(3, 0.12), (4, 0.06), (5, 0.03), (6, 0.02), (7, 0.01), (8, 0.0), (9, 0.0)$$

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.

---

15. Is the equation below a linear function?

$$f(x) = -2(x - 2) + 2$$

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 -2(x -2)+2. 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).

---

16. Is the following relation a linear function?

x	y
3	8.66
4	10.0
5	11.18
6	-11.18
5	-8.66
4	-10.0
3	-11.18

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.

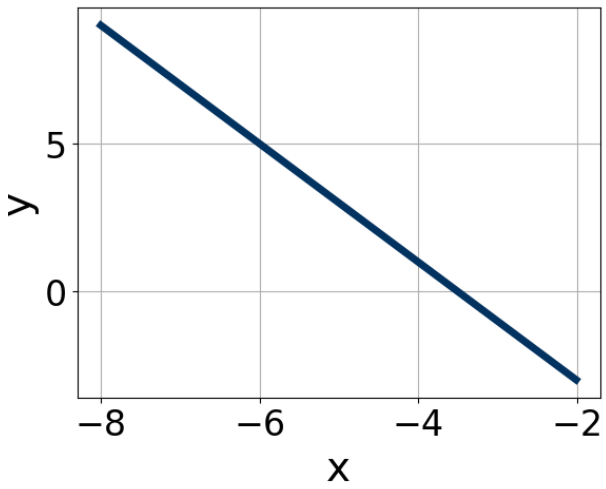
B. No

* 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).

---

17. 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 -2(x + 5)+3. 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.

---

18. Is the following relation a function?

x	y
3	-3
4	-4
5	-5
6	-5
5	3
4	4
3	5

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.

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

---

19. Is the equation below a linear function?

$$f(x) = 2\left(\frac{1}{2}\right)^{x-2} + 1$$

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. $2\left(\frac{1}{2}\right)^{x-2} + 1 is a base - 0.5 exponential function No, the equation is not lin$

* Correct! $2\left(\frac{1}{2}\right)^{x-2} + 1 is not a degree - 1 polynomial.$

General Comment: The equation graphed was $2\left(\frac{1}{2}\right)^{x-2} + 1. A linear function is a degree - 1 polynomial. Polynomial eq$ $= 3x^2 - 2x + 4$. Square root and cube root functions have rational exponents (1/2 and 1/3).

---

20. Is the following relation a linear function?

x	y
2	-7.07
3	-8.66
4	-8.66
3	7.07
2	8.66
1	10.0
0	11.18

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.

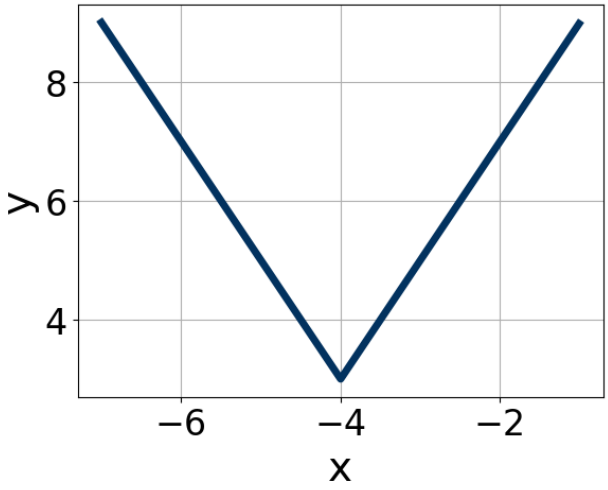
B. No

* 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).

---

21. 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 2—x + 4—+3. 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.

---

22. Is the following relation a function?

x	y
2	-20
3	-45
4	-80
5	-125
6	125
5	20
4	45

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.

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

---

23. Is the equation below a linear function?

$$f(x) = -2|x - 1| + 2$$

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. -2—x -1—+2 is a absolute value function

B. No, the equation is not linear.

* Correct! -2—x -1—+2 is not a degree-1 polynomial.

General Comment: The equation graphed was -2—x -1—+2. 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).

---

24. Is the following relation a linear function?

x	y
2	-8
3	-12
4	-16
5	16
4	8
3	12
2	16

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.

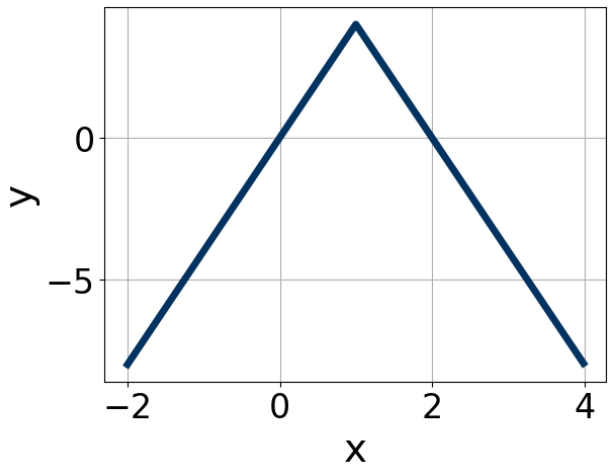
B. No

* 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).

---

25. 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 -4—x -1—+4. 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.

---

26. Is the following relation a function?

$$(4, 6.0), (5, 6.71), (6, 7.35), (7, 7.94), (8, -7.94), (7, -6.0), (6, -6.71)$$

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.

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

---

27. Is the equation below a linear function?

$$f(x) = -3\sqrt{4x + 5} + 6$$

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$\sqrt{4x + 5}$+6$is a square root function No, the equation is not linear.$

* Correct! $-3\sqrt{4x+5}+6 is not a degree-1 polynomial.$

General Comment: The equation graphed was $-3\sqrt{4x+5}+6$. A linear function is a degree−1 polynomial. Polynomial eq
$= 3x^2 - 2x + 4$. Square root and cube root functions have rational exponents (1/2 and 1/3).

---

28. Is the following relation a linear function?

x	y
-2	-5
-1	-2
0	1
1	4
2	7
3	10
4	13

The solution is Yes, which is option A.

A. Yes

* Correct! As x increases/decreases, y increases/decreases at the same rate.

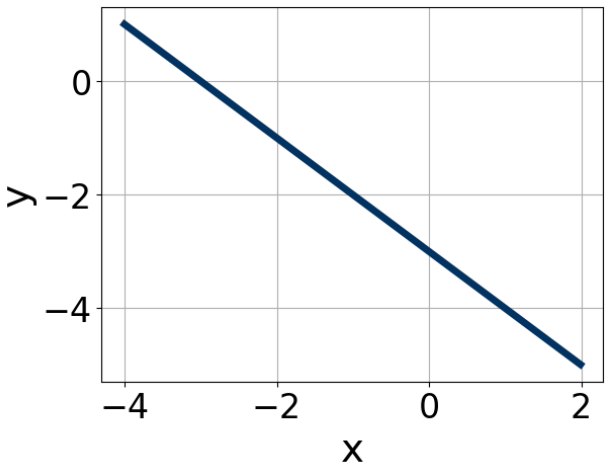
B. No

A linear function has a constant rate of growth. As x increases/decreases, y increases/decreases at the same rate.

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).

---

29. 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)-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.

---

30. Is the following relation a function?

x	y
1	-5
2	-10
3	-15
4	-20
5	20
4	5
3	10

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.

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

---

31. Is the equation below a linear function?

$$f(x) = -2|x - 3| + 2$$

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. -2—x -3—+2 is a absolute value function

B. No, the equation is not linear.

* Correct! -2—x -3—+2 is not a degree-1 polynomial.

General Comment: The equation graphed was -2—x -3—+2. 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).

---

32. Is the following relation a linear function?

x	y
-3	-14
-2	-7
-1	0
0	7
1	14
2	21
3	28

The solution is Yes, which is option A.

A. Yes

* Correct! As x increases/decreases, y increases/decreases at the same rate.

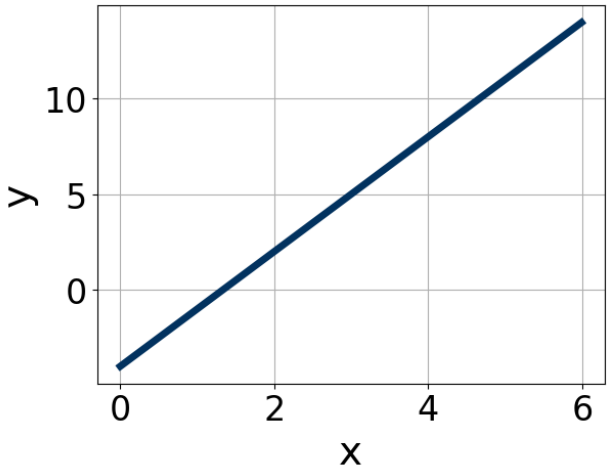
B. No

A linear function has a constant rate of growth. As x increases/decreases, y increases/decreases at the same rate.

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).

---

33. 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 3(x -3)+5. 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.

---

34. Is the following relation a function?

x	y
2	1.41
3	1.73
4	2.0
5	-2.0
4	-1.41
3	-1.73
2	-2.0

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.

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

---

35. Is the equation below a linear function?

$$f(x) = 5(x - 1) - 5$$

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 5(x -1)-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).

---

36. Is the following relation a linear function?

x	y
3	-9
4	-16
5	-25
6	-25
5	9
4	16
3	25

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.

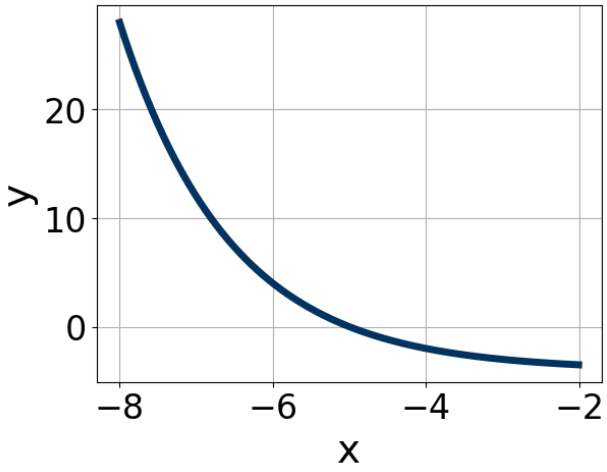
B. No

* 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).

---

37. 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 $4\left(\frac{1}{2}\right)^{x--5}-4.$ $A linear function has a constant rate of growth. This mea$ 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.

---

38. Is the following relation a function?

x	y
2	8
3	12
4	16
5	16
4	-8
3	-12
2	-16

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.

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

---

39. Is the equation below a linear function?

$$f(x) = 2(x - 3) - 1$$

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 2(x -3)-1. 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).

---

40. Is the following relation a linear function?

x	y
1	-3.0
2	-4.24
3	4.24
2	3.0
1	4.24
0	5.2
-1	6.0

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.

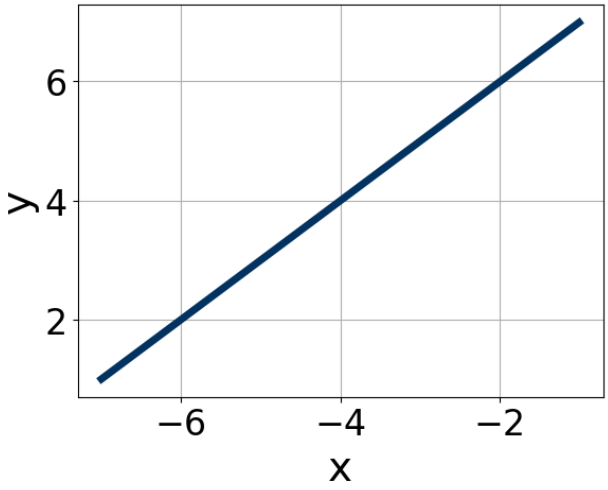
B. No

* 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).

---

41. 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 + 4)+4. 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.

---

42. Is the following relation a function?

$$(1, -4.0), (2, -5.66), (3, -6.93), (4, -8.0), (5, -8.94), (6, -9.8), (7, -10.58)$$

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.

---

43. Is the equation below a linear function?

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

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 5(x + 5)-3. 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).

---

44. Is the following relation a linear function?

x	y
1	4.0
2	5.66
3	6.93
4	8.0
5	8.94
6	9.8
7	10.58

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.

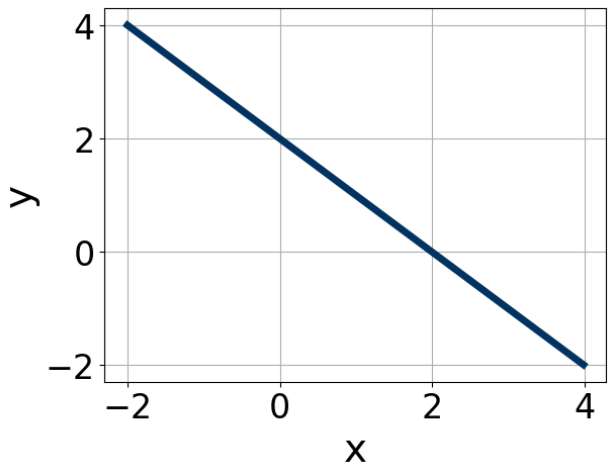
B. No

* 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).

---

45. 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.

---

46. 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.

---

47. 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).

---

48. 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.

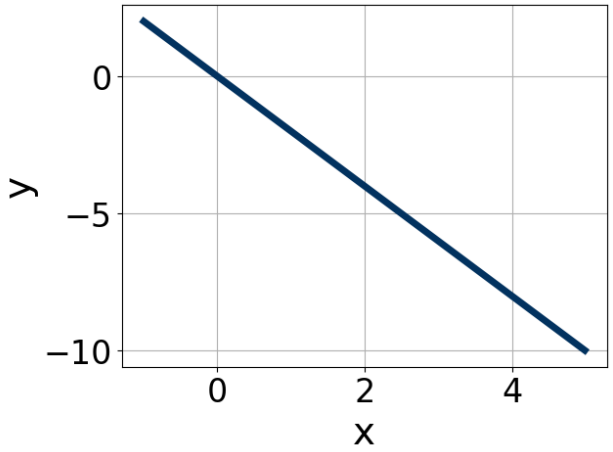
B. No

* 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).

---

49. 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 -2(x -2)-4. 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.

---

50. Is the following relation a function?

x	y
4	-64
5	-125
6	-216
7	-343
8	-512
9	-729
10	-1000

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.

---

51. Is the equation below a linear function?

$$f(x) = -3\sqrt[3]{-6x+7} + 4$$

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. $-3\sqrt[3]{-6x+7}+4 is a cube root function No, the equation is not linear.$

* Correct! $-3\sqrt[3]{-6x+7}+4 is not a degree-1 polynomial.$

General Comment: The equation graphed was $-3\sqrt[3]{-6x+7}+4. A linear function is a degree-1 polynomial. Polynomial = 3x^2 - 2x + 4$. Square root and cube root functions have rational exponents (1/2 and 1/3).

---

52. Is the following relation a linear function?

x	y
1	1.0
2	1.41
3	1.73
4	-1.73
3	-1.0
2	-1.41
1	-1.73

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.

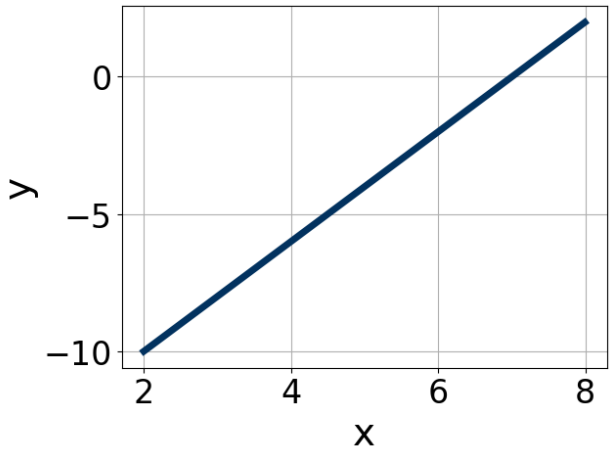
B. No

* 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).

---

53. 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 2(x -5)-4. 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.

---

54. Is the following relation a function?

x	y
1	5.0
2	7.07
3	8.66
4	10.0
5	-10.0
4	-5.0
3	-7.07

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.

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

---

55. Is the equation below a linear function?

$$f(x) = 4(x + 4) + 1$$

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 4(x + 4)+1. 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).

---

56. Is the following relation a linear function?

x	y
4	10.0
5	11.18
6	12.25
7	-12.25
6	-10.0
5	-11.18
4	-12.25

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.

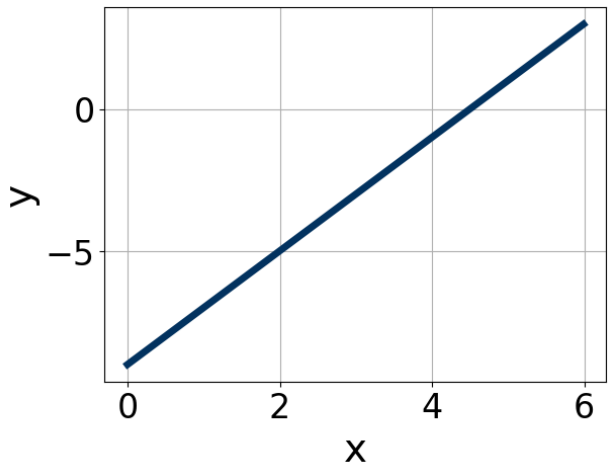
B. No

* 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).

---

57. 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 2(x -3)-3. 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.

---

58. Is the following relation a function?

x	y
1	10
2	14
3	18
4	22
5	26
6	30
7	34

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.

---

59. Is the equation below a linear function?

$$f(x) = 3(x - 5) - 4$$

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)-4. 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).

---

60. Is the following relation a linear function?

x	y
1	-5
2	-20
3	-45
4	-80
5	-80
4	5
3	20

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.

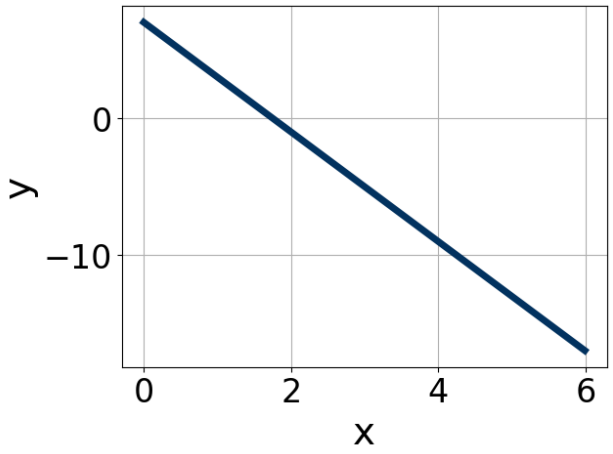
B. No

* 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).

---

61. 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 -4(x -3)-5. 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.

---

62. Is the following relation a function?

x	y
3	-3.46
4	-4.0
5	-4.47
6	-4.9
7	-5.29
8	-5.66
9	-6.0

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.

---

63. Is the equation below a linear function?

$$f(x) = -5(x - 1) - 2$$

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 -5(x -1)-2. 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).

---

64. Is the following relation a linear function?

x	y
3	-18
4	-32
5	-50
6	-72
7	-72
6	18
5	32

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.

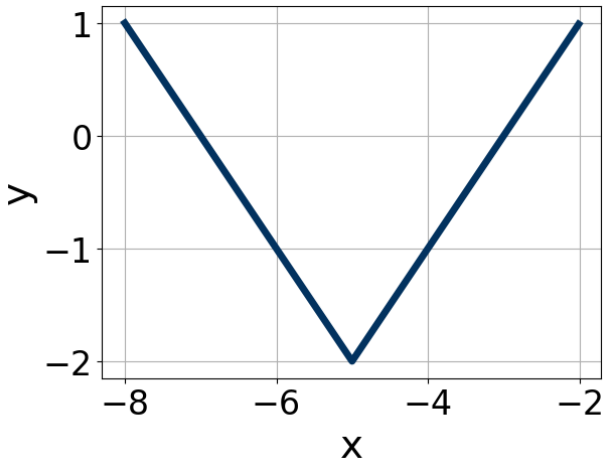
B. No

* 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).

---

65. 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.

66. 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.

---

67. 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).

---

68. 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.

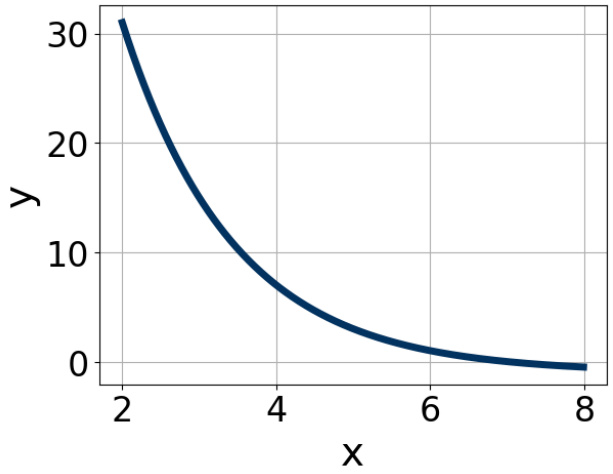
B. No

* 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).

---

69. 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 $4\left(\frac{1}{2}\right)^{x-5}-1.A linear function has a constant rate of growth. This mean$ 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.

---

70. Is the following relation a function?

$$(1, 4), (2, 16), (3, 36), (4, 64), (5, 64), (4, -4), (3, -16)$$

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.

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

---

71. Is the equation below a linear function?

$$f(x) = -5(x + 1) + 3$$

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 -5(x + 1)+3. 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).

---

72. Is the following relation a linear function?

x	y
-1	-5
0	1
1	7
2	13
3	19
4	25
5	31

The solution is Yes, which is option A.

A. Yes

* Correct! As x increases/decreases, y increases/decreases at the same rate.

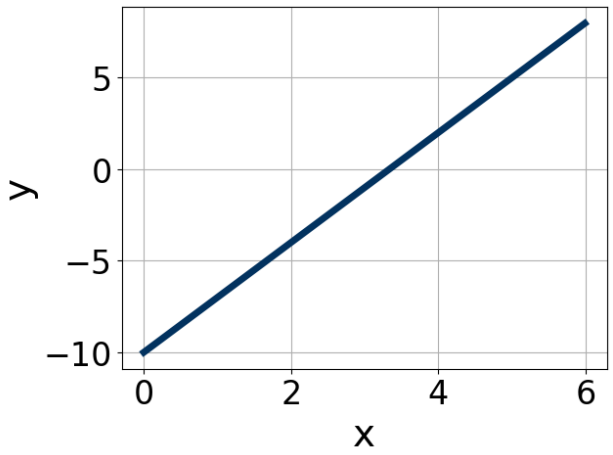
B. No

A linear function has a constant rate of growth. As x increases/decreases, y increases/decreases at the same rate.

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).

---

73. 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 3(x -3)-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.

---

74. Is the following relation a function?

x	y
1	-1
2	-4
3	-9
4	-16
5	16
4	1
3	4

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.

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

---

75. Is the equation below a linear function?

$$f(x) = 2(x - 2) + 2$$

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 2(x -2)+2. 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).

---

76. Is the following relation a linear function?

x	y
-2	-7
-1	-1
0	5
1	11
2	17
3	23
4	29

The solution is Yes, which is option A.

A. Yes

* Correct! As x increases/decreases, y increases/decreases at the same rate.

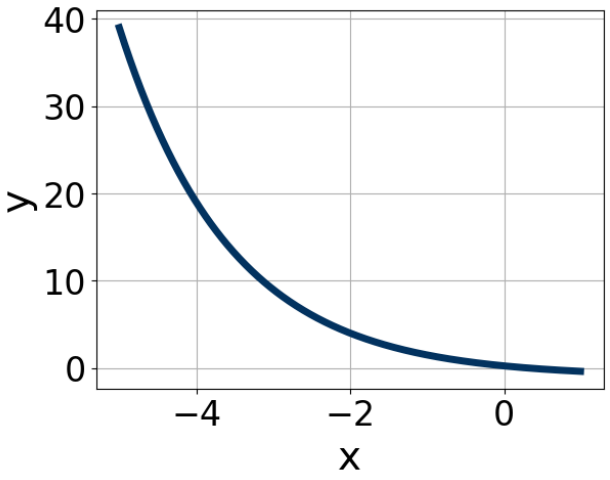
B. No

A linear function has a constant rate of growth. As x increases/decreases, y increases/decreases at the same rate.

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).

---

77. 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 $5\left(\frac{1}{2}\right)^{x--2}-1.Alinearfunctionhasaconstantrateofgrowth.Thismea$ 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.

---

78. Is the following relation a function?

x	y
1	4.0
2	8.0
3	16.0
4	32.0
5	64.0
6	128.0
7	256.0

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.

---

79. Is the equation below a linear function?

$$f(x) = -4\sqrt[3]{7x+6} - 3$$

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. $-4\sqrt[3]{7x+6}-3isacuberootfunctionNo,theequationisnotlinear.$

* Correct! $-4\sqrt[3]{7x+6}-3isnotadegree-1polynomial.$

General Comment: The equation graphed was $-4\sqrt[3]{7x+6}-3.Alinearfunctionisadegree-1polynomial.Polynomialeq$ $= 3x^2 - 2x + 4$. Square root and cube root functions have rational exponents (1/2 and 1/3).

---

80. Is the following relation a linear function?

x	y
1	2.0
2	2.83
3	-2.83
2	-2.0
1	-2.83
0	-3.46
-1	-4.0

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.

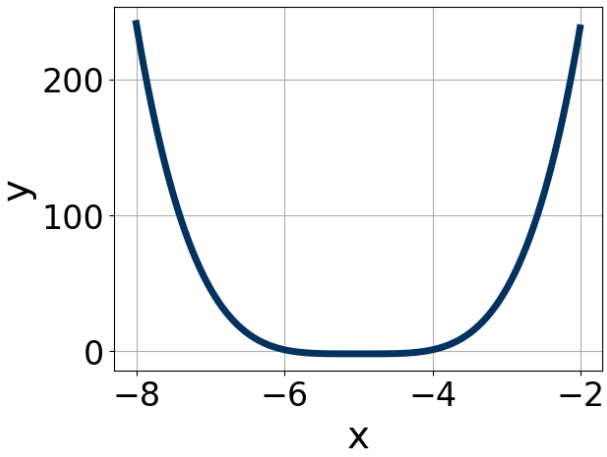
B. No

* 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).

---

81. 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 $3(x+5)^4-2$. *A linear function has a constant rate of growth. This means* 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.

---

82. Is the following relation a function?

$$(3, -27), (4, -48), (5, -75), (6, 75), (5, 27), (4, 48), (3, 75)$$

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.

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

---

83. Is the equation below a linear function?

$$f(x) = 2(x + 4) + 1$$

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 2(x + 4)+1. 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).

---

84. Is the following relation a linear function?

x	y
3	15
4	20
5	20
4	-15
3	-20
2	-25
1	-30

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.

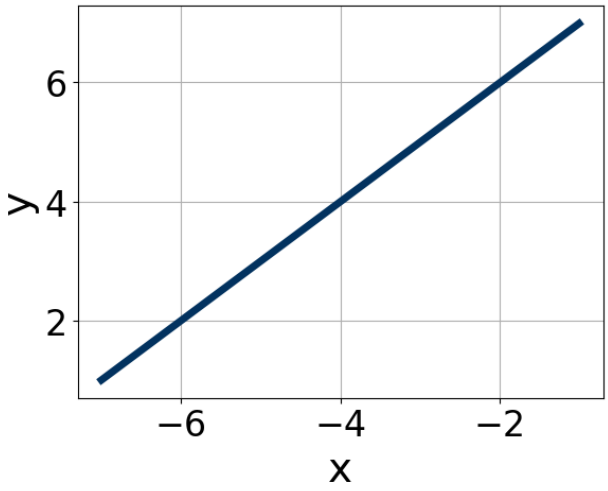
B. No

* 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).

---

85. 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 + 4)+4. 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.

---

86. Is the following relation a function?

x	y
4	-7.94
5	-8.55
6	-9.09
7	-9.56
8	-10.0
9	-10.4
10	-10.77

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.

---

87. Is the equation below a linear function?

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

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 5(x -5)-3. 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).

---

88. Is the following relation a linear function?

x	y
3	-45
4	-80
5	80
4	45
3	80
2	125
1	180

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.

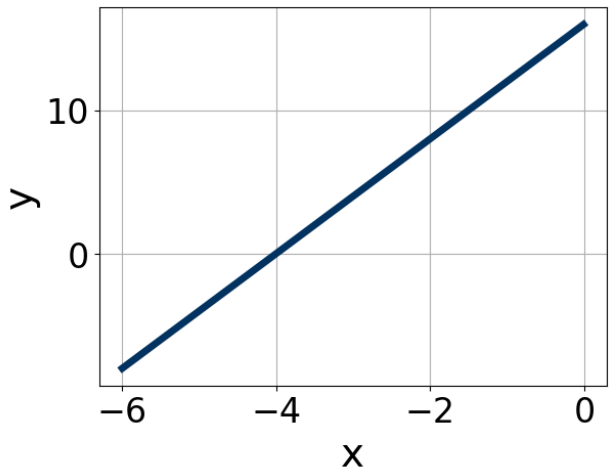
B. No

* 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).

---

89. 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 4(x + 3)+4. 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.

---

90. Is the following relation a function?

x	y
3	-27
4	-48
5	-75
6	-108
7	-147
8	-192
9	-243

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.

---

91. Is the equation below a linear function?

$$f(x) = -5(x + 5)^4 + 2$$

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. -5(x + 5)^4+2$isadegree-4polynomialNo, theequationisnotlinear.$

* Correct! -5(x + 5)^4 + 2$isnotadegree - 1polynomial.$

General Comment: The equation graphed was -5(x + 5)^4+2.$Alinearfunctionisadegree-1polynomial.Polynomialeq$ = 3x^2 − 2x + 4. Square root and cube root functions have rational exponents (1/2 and 1/3).

---

92. Is the following relation a linear function?

x	y
2	6.3
3	7.21
4	7.94
5	8.55
6	9.09
7	9.56
8	10.0

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.

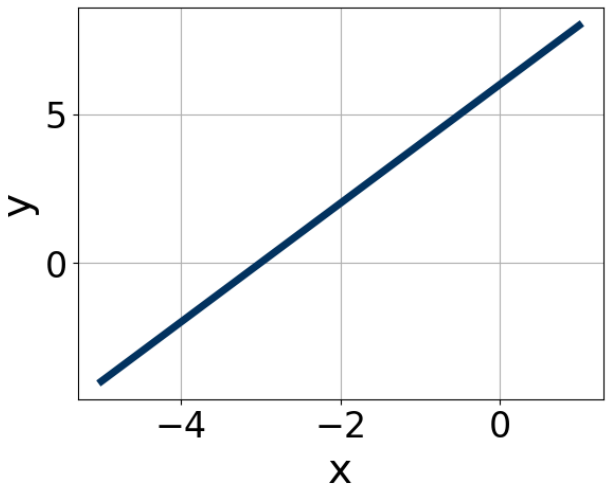
B. No

* 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).

---

93. 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 2(x + 2)+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.

---

94. Is the following relation a function?

$$(-4, -48), (-3, -27), (-2, -12), (-1, -3), (0, 0), (1, -3), (2, -12)$$

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.

---

95. Is the equation below a linear function?

$$f(x) = 5(x - 5) + 2$$

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 5(x -5)+2. 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).

---

96. Is the following relation a linear function?

x	y
1	-2
2	-4
3	-4
2	2
1	4
0	6
-1	8

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.

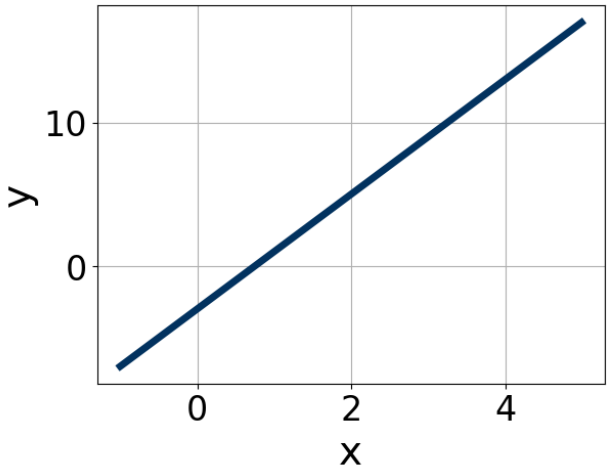
B. No

* 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).

---

97. 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 4(x -2)+5. 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.

---

98. Is the following relation a function?

$$(4, 0.12), (5, 0.06), (6, 0.03), (7, 0.02), (8, 0.01), (9, 0.0), (10, 0.0)$$

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.

---

99. Is the equation below a linear function?

$$f(x) = 4(x + 5) - 1$$

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 4(x + 5)-1. 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).

---

100. Is the following relation a linear function?

x	y
2	-0.25
3	-0.12
4	-0.06
5	-0.03
6	-0.02
7	-0.01
8	-0.0

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).
