Is it a function — Sets of ordered pairs

Name: _____ Date: _____

Does each set of ordered pairs show a function? Show how you know.

1 (3, 12) (7, 20) (17, 31) (19, 18) (6, 20)

inputs 3, 7, 17, 19, 6 — no repeat
A function

2 (1, 16) (16, 59) (13, 56) (16, 49)

3 (3, 44) (11, 44) (15, 9) (1, 47)

4 (22, 45) (24, 60) (9, 18) (2, 2)

5 (10, 54) (12, 47) (13, 33) (3, 57) (3, 59)

6 (18, 49) (4, 52) (11, 54) (18, 2) (20, 43)

7 (4, 59) (4, 1) (13, 21) (6, 33)

8 (14, 59) (5, 44) (4, 13) (23, 40) (9, 38)

9 (12, 28) (1, 46) (17, 18) (17, 4)

10 (7, 41) (18, 52) (10, 26) (1, 26) (8, 56)

Name: _____ Date: _____

Is each equation linear or nonlinear? Circle one.

1. $y = 35/x$ Linear / (Nonlinear)
2. $y = 10x^2 + 14$ Linear / Nonlinear
3. $y = 94$ Linear / Nonlinear
4. $y = 3x^2 + 12$ Linear / Nonlinear
5. $y = 60$ Linear / Nonlinear
6. $y = 35$ Linear / Nonlinear
7. $y = 16/x$ Linear / Nonlinear
8. $y = 26/x$ Linear / Nonlinear
9. $y = x/9 + 16$ Linear / Nonlinear
10. $y = 8x + 37$ Linear / Nonlinear

How many solutions — Compare both sides

Name: _____ Date: _____

How many solutions does each equation have? Show how you know.

1 $17x + 25 = 25 + 17x$

x is gone
25 = 25 is true
infinitely many solutions

2 $-15x - 39 = -39 - 15x$

3 $15x + 44 = 20x - 8$

4 $-14x - 39 = -13x - 54$

5 $14x - 45 = 14x - 46$

6 $13x - 27 = -27 + 13x$

7 $-6x - 38 = -11x - 52$

8 $-8x - 5 = -8x$

9 $4x - 19 = 4x - 11$

10 $11x - 14 = 4x + 60$

Function notation — Evaluating f(x)

Name: _____ Date: _____

Work out the value each function asks for.

1. $f(x) = 7x - 10$ $f(-5) =$ -45

2. $f(x) = 4x - 13$ $f(-3) =$ ____

3. $f(x) = 8x - 5$ $f(5) =$ ____

4. $f(x) = -9x + 20$ $f(-3) =$ ____

5. $f(x) = 3x - 1$ $f(-3) =$ ____

6. $f(x) = -6x + 7$ $f(2) =$ ____

7. $f(x) = x + 7$ $f(-6) =$ ____

8. $f(x) = x + 16$ $f(2) =$ ____

9. $f(x) = -5x + 6$ $f(5) =$ ____

10. $f(x) = 4x - 13$ $f(4) =$ ____

Name: _____ Date: _____

Work the inside function first, then the outside one.

1. $f(x) = 5x - 9$ $g(x) = x + 1$ $f(g(-3)) =$ -19
2. $f(x) = 2x - 8$ $g(x) = x - 8$ $f(g(3)) =$ _____
3. $f(x) = -4x - 6$ $g(x) = 3x + 2$ $f(g(-3)) =$ ____
4. $f(x) = 2x - 5$ $g(x) = -x - 7$ $f(g(-4)) =$ _____
5. $f(x) = -3x + 9$ $g(x) = -x - 6$ $f(g(-4)) =$ ____
6. $f(x) = 5x - 5$ $g(x) = 3x - 1$ $f(g(4)) =$ ____
7. $f(x) = 4x + 1$ $g(x) = -2x + 4$ $f(g(5)) =$ _____
8. $f(x) = -5x - 5$ $g(x) = 2x - 8$ $f(g(-2)) =$ ____
9. $f(x) = 4x + 8$ $g(x) = 4x$ $f(g(-2)) =$ _____
10. $f(x) = -2x + 4$ $g(x) = -2x$ $f(g(5)) =$ ____

Power Pack · Functions and how many solutions — Answer key

Function?

1. (3, 12) (7, 20) (17, 31) (19, 18) (6, 20): Yes — every input appears once — 20 turns up twice, but that is an output, and two inputs may land on the same one

2. (1, 16) (16, 59) (13, 56) (16, 49): No — the input 16 goes to 59 and also to 49, and one input may only go to one place

3. (3, 44) (11, 44) (15, 9) (1, 47): Yes — every input appears once — 44 turns up twice, but that is an output, and two inputs may land on the same one

4. (22, 45) (24, 60) (9, 18) (2, 2): Yes — every input appears once, so no input can go to two places

5. (10, 54) (12, 47) (13, 33) (3, 57) (3, 59): No — the input 3 goes to 57 and also to 59, and one input may only go to one place

6. (18, 49) (4, 52) (11, 54) (18, 2) (20, 43): No — the input 18 goes to 49 and also to 2, and one input may only go to one place

7. (4, 59) (4, 1) (13, 21) (6, 33): No — the input 4 goes to 59 and also to 1, and one input may only go to one place

8. (14, 59) (5, 44) (4, 13) (23, 40) (9, 38): Yes — every input appears once, so no input can go to two places

9. (12, 28) (1, 46) (17, 18) (17, 4): No — the input 17 goes to 18 and also to 4, and one input may only go to one place

10. (7, 41) (18, 52) (10, 26) (1, 26) (8, 56): Yes — every input appears once — 26 turns up twice, but that is an output, and two inputs may land on the same one

Linear?

1. $y = 35/x$: Nonlinear — x is underneath, so doubling x halves y instead of adding the same amount again

2. $y = 10x^2 + 14$: Nonlinear — x is squared, so the steps in y grow as x grows

3. $y = 94$: Linear — y is always 94 whatever x does — that graph is a flat line, and flat is a slope of zero rather than no slope

4. $y = 3x^2 + 12$: Nonlinear — x is squared, so the steps in y grow as x grows

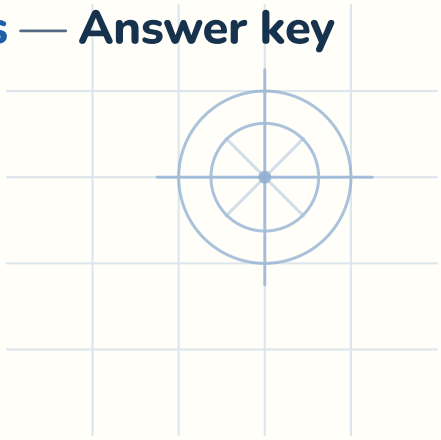
5. $y = 60$: Linear — y is always 60 whatever x does — that graph is a flat line, and flat is a slope of zero rather than no slope

6. $y = 35$: Linear — y is always 35 whatever x does — that graph is a flat line, and flat is a slope of zero rather than no slope

7. $y = 16/x$: Nonlinear — x is underneath, so doubling x halves y instead of adding the same amount again

8. $y = 26/x$: Nonlinear — x is underneath, so doubling x halves y instead of adding the same amount again

Power Pack · Functions and how many solutions — Answer key



Linear?

9. y = x/9 + 16: Linear — dividing by 9 is multiplying by a number, so the steps in y stay equal

10. y = 8x + 37: Linear — x is only multiplied by a number and added to, so equal steps in x give equal steps in y

Solution count

1. 17x + 25 = 25 + 17x: infinitely many

2. −15x − 39 = −39 − 15x: infinitely many

3. 15x + 44 = 20x − 8: one solution

4. −14x − 39 = −13x − 54: one solution

5. 14x − 45 = 14x − 46: no solution

6. 13x − 27 = −27 + 13x: infinitely many

7. −6x − 38 = −11x − 52: one solution

8. −8x − 5 = −8x: no solution

9. 4x − 19 = 4x − 11: no solution

10. 11x − 14 = 4x + 60: one solution

Evaluating f(x)

1. f(x) = 7x − 10 f(−5) = −45

2. f(x) = 4x − 13 f(−3) = −25

3. f(x) = 8x − 5 f(5) = 35

4. f(x) = −9x + 20 f(−3) = 47

5. f(x) = 3x − 1 f(−3) = −10

6. f(x) = −6x + 7 f(2) = −5

7. f(x) = x + 7 f(−6) = 1

8. f(x) = x + 16 f(2) = 18

9. f(x) = −5x + 6 f(5) = −19

10. f(x) = 4x − 13 f(4) = 3

Composing functions

1. f(x) = 5x − 9 g(x) = x + 1 f(g(−3)) = −19

2. f(x) = 2x − 8 g(x) = x − 8 f(g(3)) = −18

3. f(x) = −4x − 6 g(x) = 3x + 2 f(g(−3)) = 22

4. f(x) = 2x − 5 g(x) = −x − 7 f(g(−4)) = −11

5. f(x) = −3x + 9 g(x) = −x − 6 f(g(−4)) = 15

6. f(x) = 5x − 5 g(x) = 3x − 1 f(g(4)) = 50

7. f(x) = 4x + 1 g(x) = −2x + 4 f(g(5)) = −23

8. f(x) = −5x − 5 g(x) = 2x − 8 f(g(−2)) = 55

9. f(x) = 4x + 8 g(x) = 4x f(g(−2)) = −24

10. f(x) = −2x + 4 g(x) = −2x f(g(5)) = 24