Name Functions and their Inverses | 1.1

Ready, Set, Go! Sample Answers

Ready

Topic: inverse operations

Inverse operations *"undo"* each other. For instance, addition and subtraction are inverse operations. So are multiplication and division. In mathematics, it is often convenient to *undo* several operations in order to solve for a variable.

Solve for x, in the following problems. Then complete the statement by identifying the operation you used to *"undo"* the equation.

1. $24 = 3x$ Undo multiplication by 3 by dividing by 3 $x=8$
2. $\frac{x}{5} = -2$ Undo division by 5 by multiplying by 5 $x=-16$
3. $x+17=20$ Undo add 17 by subtracting 17 $x=3$
4. $\sqrt{x}=6$ Undo the square root by squaring $x=36$
5. $\sqrt[3]{(x+1)}=2$ Undo the cube root by cubing then subtracting 1 $x=7$
6. $x^4=81$ Undo raising x to the 4th power by taking the 4th root $x=3$
7. $(x-9)^2=49$ Undo squaring by taking the square root then adding 9 $x=16$

Set

Topic: Linear functions and their inverses

Carlos and Clarita have a pet sitting business. When they were trying to decide how many each of dogs and cats they could fit into their yard, they made a table based on the following information. Cat pens require 6 ft² of space, while dog runs require 24 ft². Carlos and Clarita have up to 360 ft² available in the storage shed for pens and runs, while still leaving enough room to move around the cages.

They quickly realized that they could have 4 cats for each dog, so they counted the number of cats by 4.

cats	0	4	8	12	16	20	24	28	32	36	40	44	48	52	56	60
dogs	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0

8. Use the information in the table to write 5 ordered pairs that have cats as the input value and dogs as the output value. answers may vary

(16, 11) (28, 8) (36, 6) (48, 3) (56, 1)

9. Write an explicit equation that shows how many dogs they can accommodate based on how many cats they have. (The number of dogs "d" will be a function of the number of cats "c" or $d = f(c)$.)

$d = 15 - \frac{1}{4}c$

10. Use the information in the table to write 5 ordered pairs that have dogs as the input value and cats as the output value. answers may vary

(13, 8) (10, 20) (9, 24) (7, 32) (5, 40)

11. Write an explicit equation that shows how many cats they can accommodate based on how many dogs they have. (The number of cats "c" will be a function of the number of dogs "d" or $c = g(d)$.)

$C = 60 - 4d$

12. Look back at problem 8 and problem 10. Describe how the ordered pairs are different.

The input and output values switched places

13. Look back at the equations you wrote in problems 9 and 11. What relationships do you see between them? (Consider the numbers in the equations. Also, define the domain and range for each equation.) Func. # 9 D: (0, 60) R: (0, 15)
Func. # 11 D: (0, 15) R: (0, 60)

These functions are inverses