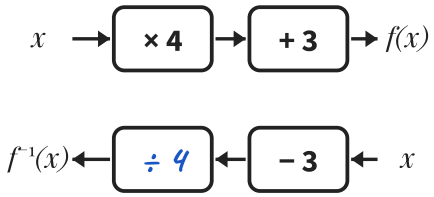
Inverse functions

ANSWERS

1

$f(x) = 4x + 3$

Find $f^{-1}(x)$

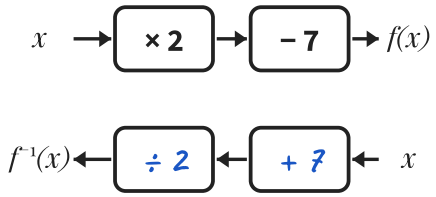


$f^{-1}(x) =$ $\frac{x - 3}{4}$

2

$f(x) = 2x - 7$

Find $f^{-1}(x)$



$f^{-1}(x) =$ $\frac{x + 7}{2}$

3

$f(x) = \frac{x + 6}{5}$

Find $f^{-1}(x)$

write $y = f(x)$

$y =$ $\frac{x + 6}{5}$

make x the subject

$x =$ $5y - 6$

swap y for x

$f^{-1}(x) =$ $5x - 6$

$f^{-1}(x) =$ $5x - 6$

4

$f(x) = \frac{x}{3} - 2$

Find $f^{-1}(x)$

write $y = f(x)$

$y =$ $\frac{x}{3} - 2$

make x the subject

$x =$ $3(y + 2)$

swap y for x

$f^{-1}(x) =$ $3(x + 2)$

$f^{-1}(x) =$ $3(x + 2)$

5

$f(x) = 5x + 4$

Find $f^{-1}(x)$, then work out $f^{-1}(19)$

$f^{-1}(x) = \frac{x - 4}{5}$

$f^{-1}(19) = \frac{19 - 4}{5}$

$f^{-1}(19) =$ 3

6

$f(x) = 7 - 3x$

Find $f^{-1}(x)$

$y + 3x = 7$, so $3x = 7 - y$

$f^{-1}(x) =$ $\frac{7 - x}{3}$

7

$f(x) = 3x - 2$

Ben says $f^{-1}(x) = \frac{1}{3x - 2}$.

Explain his mistake, then find $f^{-1}(x)$.

f^{-1} means undo f, not 1 over f

$f^{-1}(x) =$ $\frac{x + 2}{3}$

8

$f(x) = 4x - 5$

Work out $f(2)$. Then find $f^{-1}(x)$ and use it to work out f^{-1} of your answer. What do you notice?

$f(2) = 3$, $f^{-1}(x) = \frac{x + 5}{4}$

$f^{-1}(3) = 2$: back to 2

Answer back to 2

Inverse functions *further practice*

ANSWERS

9

$f(x) = \frac{2x+1}{5}$

Find $f^{-1}(x)$

$5y = 2x + 1$

$x = \frac{5y - 1}{2}$

$f^{-1}(x) = \frac{5x - 1}{2}$

10

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

Find $f^{-1}(x)$

$y \div 2$, then $+ 3$

$f^{-1}(x) = \frac{x + 6}{2}$ or $\frac{x}{2} + 3$

11

$f(x) = 3x - 4$

Solve $f^{-1}(x) = 6$

$f^{-1}(x) = \frac{x + 4}{3}$

$\frac{x + 4}{3} = 6$, so $x + 4 = 18$

$x =$ 14

12

A gym charges £15 to join and £4 a visit, so x visits cost $f(x) = 4x + 15$ pounds.
Find $f^{-1}(x)$. Kemi has spent £63.
How many visits is that?

$f^{-1}(x) = \frac{x - 15}{4}$

$f^{-1}(63) = \frac{63 - 15}{4}$

Visits 12

13

Ravi thinks of a number x.
He multiplies it by 4, then takes the result away from 30. Write this as $f(x)$.
Find $f^{-1}(x)$ and use it to find Ravi's number when he gets 10.

$f(x) = 30 - 4x$, $f^{-1}(x) = \frac{30 - x}{4}$

$f^{-1}(10) = \frac{30 - 10}{4}$

Number 5

14

$f(x) = \frac{9x}{5} + 32$ changes x degrees Celsius to degrees Fahrenheit.
Find $f^{-1}(x)$. Use it to change 77 °F to degrees Celsius.

$y - 32 = \frac{9x}{5}$, $x = \frac{5(y - 32)}{9}$

$f^{-1}(77) = \frac{5 \times 45}{9}$

Answer 25 °C

15

$f(x) = 6 - 2x$

Find $f^{-1}(x)$, then solve $f(x) = f^{-1}(x)$

$f^{-1}(x) = \frac{6 - x}{2}$

$12 - 4x = 6 - x$, so $3x = 6$

$x =$ 2

16

$f(x) = 2x + 6$ and $g(x) = \frac{x}{2} - 3$

Show that g is the inverse of f.
Explain how you know.

$g(f(x)) = \frac{2x + 6}{2} - 3 = x + 3 - 3 = x$

g undoes f, so $g(x) = f^{-1}(x)$

Answer $g(x) = f^{-1}(x)$