

FUNCTIONS

CANSU OLCE

A STAR MATHS (www.astarmaths.com.au)

1. $f(x \cdot y) = f(x) + f(y)$
 $f(2) = 5$
 $f(8) = ?$

2. $g(x) = 2^x + 1$
 $g^{-1}(9) = ?$

3. $f(4x - 2) = \frac{3x - 1}{x - 2}$
 $f^{-1}(8) = ?$

4. $f(x) = \begin{cases} 4x + 3 & x < 1 \\ x^2 + 1 & x \geq 1 \end{cases}$
 $g(x) = 2x + 5$
 $f \circ g(-1) = ?$

5. $f(2x^2 - x) = 4x^2 - 2x + 5$
 $f(3) = ?$

6. $f(x) = 4x - 9$
 $(g^{-1} \circ f)(-2) = 5$
 $g(5) = ?$

7. $f(x + 1) = 3x - 2$
 $g(x - 1) = 4x + 5$
 $g \circ f^{-1}(4) = ?$

8. $f(x) = 3x^2 + 4$
 $g(x) = 3x - 2$
 $[f^{-1} \circ g]^{-1}(x) = x^2 + a$
 $a = ?$

9. $f(x, y) = \max(x^2 - 2, xy + 3)$
 $g(x, y) = \max(3x + y, 2x - y)$
 $f(-1, 4) + g(-2, 5) = ?$

10. $f(x) = ax + b$
 $f^{-1}(7) = 3$
 $f^{-1}(-5) = -1$
 $f^{-1}(10) = ?$

11. $f(x) = 3^{2x-3} + 1$
 $f^{-1}(28) = ?$

12. $f(x) = 2f(x-1) + 4$
 $f(5) = 64$
 $f(2) = ?$

13. $f(x) = \begin{cases} 3x^2 + 1 & x \leq 1 \\ 4x - 7 & x > 1 \end{cases}$
 $f(0) + f(2) = ?$

14. $f(2x+1) = 4x - 3$
 $2f(x) - f(x+1) = 5$
 $x = ?$

15. $f(x) = 3x^2 - 5$
 $g(x) = x + 1$
 $f \circ g^{-1}(-1) = ?$

16. $f(x) = \frac{3x-a}{2x+1}$ and $g(x) = \frac{x-1}{x+1}$
 $(f^{-1} \circ g)(3) = \frac{1}{4} \Rightarrow a = ?$

17. $f(x) = \frac{x+1}{x-1}$
 $g(x) = 4x - 1$
 $(f^{-1} \circ g)^{-1}(2) = ?$

18. $f(x) + 2f(-x) = x^2 - 3x$
 $f(1) = ?$

19. $f(x) = 3x - 7$
 $g(x) = 4x + 6$
 $(f + g)(-1) = ?$

20. If $f(x) = (8 - a)x + 4b + 12$ is an identity function, what is the value of $a \cdot b$?

21. $f(x)$ is a constant function.

$$f(x) = \frac{12x^2 - 6x + b}{ax^2 + 18x - 9}$$

$$f(7) = ?$$

22. $f(x) = ax + b$
 $f(2) = 6$
 $f(3) = 8$
 $f^{-1}(x) = ?$

23. $f: \mathbb{R} - \{a\} \rightarrow \mathbb{R} - \{b\}$,

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

Find $a + b$.

24. $g(x) = 3x - 4$

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

Find $g \circ f(1)$.

25. $f(x) = 2x + 4$

$$g(x) = x + 1$$

Find $f \circ g(2)$.

26. $a \in \mathbb{R}^+$

$$f(x) = ax + b$$

$$f \circ f(x) = 9x + 4$$

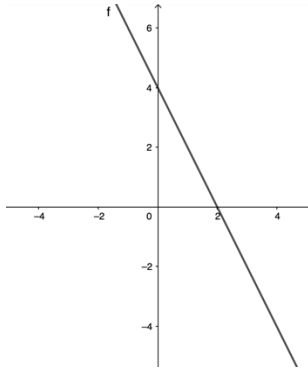
Find $f(2)$.

27. $f \circ g^{-1}(x) = 3x + 2$

$$g \circ f(x) = 2x - 1$$

$$f \circ f(3) = ?$$

28.



$$f(x) = ax + b \Rightarrow f(1) = ?$$

29. $f, g: \mathbb{R} \rightarrow \mathbb{R}$

$$g(x) = x - 1$$

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

$$(g \circ f^{-1})(x) = ?$$

30. $f(x) = x + 1$

$$g^{-1}(x) = 3x - 4$$

$$f \circ g(2) = ?$$

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

$$f(2x) = m \cdot (f(x))^2$$

$$m = ?$$

32. $f(2x + 1) = 3x + 4$
 $f^{-1}(a) = 1$
 $a = ?$

33. $f(2x + 1) = 4x - 3$
 $g(3x) = 2x + 4$
 $g \circ f(7) = ?$

34. $f(x) = \frac{x^2 - 2}{x - 1}$
 $g(x) = x + 1$
 $f \circ g^{-1}(3) = ?$

35. $f(x) = ax + b$
 $g(x) = 3x - 2$
 $g \circ f(x) = g^{-1}(x)$
 $a + b = ?$

36. $f^{-1}\left(\frac{4x + m}{x + 1}\right) = 3x - 4$
 $f(5) = 2$
 $m = ?$

37. $f(x) = x + 2$

$$f \circ g(x) = \frac{x + 1}{x - 2}$$

$$g(x) = ?$$

38. $f(x + 1) = 2x - 3$

$$f(x) = ?$$

39. $f(x) = \frac{x + 1}{2x - 1}$

Find $f(2x)$ in terms of $f(x)$.

40. $f(x) = ax + b$

$$f(1) = 1$$

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

Find $a - b$.

41. $f(x) = 3x + a$

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

$$g(1) = 8$$

$$a = ?$$

42. $f(x) = 3x - 2$
 $g(x) = 4x + 1$
 $h(x) = x^2 - 2$
 $f \circ g \circ h(-1) = ?$

43. $f(x) = 2^{x+1}$
Find $f(2x)$ in terms of $f(x)$.

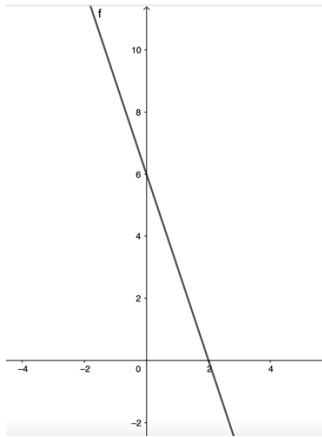
44. $f: R - \{a\} \rightarrow R - \{b\}$
 $f(x) = \frac{x+4}{3x+6}$
Find $a + b$.

45. $f \circ f^{-1}(4x+7) = 15$
Find x .

46. $[f(x)]^2 - 4xf(x) + 3 = 0$
Find $f^{-1}(3)$.

47. $2f(x) = x + 7$
 $f(1) + f(25) = ?$

48.



Find $f(2) + f^{-1}(6)$.

49. At Joe's pizzeria a pizza costs \$5 with the first topping, and then an additional 75 cents for each additional topping.

If x represents the number of toppings on a pizza, find the function represents the cost of a pizza with at least one topping.

50. The function f is given by $f(x) = x^2 - 6x + 13$ for $x \geq 3$.
Find $f^{-1}(x)$.

ANSWER KEY

1. 15
2. 3
3. 10
4. 10
5. 11
6. -17
7. 21
8. 2
9. -10
10. 4
11. 3
12. $9/2$
13. 2
14. 6
15. 7
16. 0
17. 1
18. $10/3$
19. -8
20. -21
21. $-1/3$
22. $(x-2)/2$
23. 3
24. -1
25. 10
26. 7
27. 17
28. 2
29. $(x+4)/2$
30. 3
31. $1/3$
32. 4
33. 10
34. 2
35. 1
36. -4
37. $(-x+5)/(x-2)$

38. $2x-5$

39. $\frac{2f(x)-1}{4(f(x)+2)}$

40. 5

41. -1

42. -11

43. $\frac{f^2x}{2}$

44. $-5/3$

45. 2

46. 1

47. 8

48. 0

49. $f(x)=5+0.75x$

50. $f^{-1}(x) = \sqrt{x-4} + 3$

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