



Evaluate.

1. $f(1) = \boxed{3}$

2. $g(-3) = \boxed{1}$

3. $(f+g)(3) = \boxed{2}$
 $-1+3$

6. $(f/g)(1) = \boxed{\frac{3}{2} = 1.5}$
 $3/2$

9. $f(g(f(3))) = \boxed{2}$
 $f(g(-1))$
 $f(2)$

4. $(g-f)(-1) = \boxed{1}$
 $2-1$

5. $(fg)(3) = \boxed{-3}$
 $=1 \cdot 3$

7. $f(g(-3)) = \boxed{3}$
 $f(1)$

8. $g(f(-6)) = \boxed{2}$
 $g(-1)$

Given $h(x) = 2x + 1$ and $k(x) = \frac{8}{x-4}$, evaluate the following.

10. $(h+k)(6) = \boxed{13+4=17}$

11. $h(k(2)) = \boxed{h(-4) = -7}$

12. $k(h(-3)) = \boxed{k(-5) = \frac{8}{-9}}$

13. $(h-k)(x) = \boxed{2x+1 - \frac{8}{x-4}}$

14. $h(k(x)) = \boxed{\frac{16}{x-4} + 1}$
 $2(\frac{8}{x-4}) + 1$

15. $k(h(x)) = \boxed{\frac{8}{2x-3}}$
 $\frac{8}{(2x+1)-4}$

Find the inverse of the given functions, and determine if the inverse is a function.

16. $f(x) = 3x - 5$
 $x = 3y - 5$
 $x + 5 = 3y$
 $\frac{x+5}{3} = y$ $f^{-1}(x) = \frac{x+5}{3}$

17. $f(x) = x^2 + 2$
 $x = y^2 + 2$
 $x - 2 = y^2$
 $\pm\sqrt{x-2} = y$
 $f^{-1}(x) = \pm\sqrt{x-2}$ **No**

18. $f(x) = \frac{1}{x-7}$
 $x = \frac{1}{y-7}$
 $x(y-7) = 1$
 $xy - 7x = 1$
 $xy = 7x + 1$
 $y = \frac{7x+1}{x}$
 $f^{-1}(x) = \frac{7x+1}{x}$ **Yes**

Solve the system of equations. **YES**

19. $6x + 3y = 6$
 $8x + 5y = 12$ $(-1, 4)$
 $\begin{bmatrix} 6 & 3 \\ 8 & 5 \end{bmatrix}^{-1} \begin{bmatrix} 6 \\ 12 \end{bmatrix}$

20. $4x - 3y - 2z = 21$
 $6y - 5z = -8$ $(2, -3, -2)$
 $z = -2$
 $\begin{bmatrix} 4 & -3 & -2 \\ 0 & 6 & -5 \\ 0 & 0 & 1 \end{bmatrix}^{-1} \begin{bmatrix} 21 \\ -8 \\ -2 \end{bmatrix}$

21. $2x + y + z = 18$
 $x + y = z + 2$ $(8, -2, 4)$
 $x + z = -6y$
 $\begin{bmatrix} 2 & 1 & 1 \\ 1 & 1 & -1 \\ 1 & 6 & 1 \end{bmatrix}^{-1} \begin{bmatrix} 18 \\ 2 \\ 0 \end{bmatrix}$

22. The sum of three numbers is 15. If the second is subtracted from 6 times the first, the result is 1 less than the third. If twice the first is added to the second, their sum is 3 more than the third. What are the numbers?

$x + y + z = 15$
 $6x - y = z - 1$
 $2x + y = z + 3$
 $\begin{bmatrix} 1 & 1 & 1 \\ 6 & -1 & -1 \\ 2 & 1 & -1 \end{bmatrix}^{-1} \begin{bmatrix} 15 \\ -1 \\ 3 \end{bmatrix}$ $\boxed{2, 6, 7}$