

Perform the indicated operation and state the domain. Let $f(x) = x - 1$ and $g(x) = 2x$.

13. $(f + g)(3)$
 $2 + 6 = 8$
 $f(3) = 2$
 $g(3) = 6$

14. $(f \cdot g)(x)$
 $(x-1)(2x)$
 $2x^2 - 2x$

15. $(g \circ f)(x)$
 $g(f(x))$
 $g(x-1)$
 $2(x-1)$

Find the domain restrictions, and then state the domain in set notation.

16. $f(x) = -\sqrt{2x+8} + 1$

$2x+8 \geq 0$
 $2x \geq -8$
 $x \geq -4$

17. $f(x) = \sqrt{x+3}$

$x+3 \geq 0$
 $x \geq -3$

18. $y = \frac{x^2 - 4}{2x - 3}$

$2x-3 \neq 0$
 $2x \neq 3$
 $x \neq 3/2$

Find the inverse of the function.

19. $f(x) = 2x - 4$

$y = 2x - 4$
 $x = \frac{y+4}{2}$

20. $f(x) = x^2, x \geq 0$

$y = x^2$
 $\sqrt{x} = \sqrt{y^2}$
 $y = \sqrt{x}$

$\frac{x+4}{2} = \frac{2y}{2}$

Solve the following equations. Show your work when you check for extraneous solutions.

21. $(\sqrt[3]{2x})(4)^3$

$2x = 64$
 $x = 32$

22. $(\sqrt{3x})^2 = (\sqrt{x+6})^2$

$3x = x + 6$
 $2x = 6$
 $x = 3$

23. $(x-3)^3 - 7 = 9$

$[(x-3)^{2/3}]^{3/2} = [16]^{3/2}$

$x-3 = \pm 16^{3/2}$

$x-3 = \pm (\sqrt{16})^3$

$x-3 = \pm 4^3$

$x-3 = \pm 64$ $x = 3 \pm 64$

13. 8

14. $2x^2 - 2x$

15. $2x - 2$

16. Domain: $[-4, \infty)$

17. Domain: $[-3, \infty)$

18. Domain: $(-\infty, 3/2)$
 $\cup (3/2, \infty)$

19. $f^{-1}(x) = \underline{\frac{1}{2}x + 2}$

20. $f^{-1}(x) = \underline{\sqrt{x}}$

21. $x = 32$

22. $x = 3$

23. $x = 67, -61$