

Find the domain in interval notation for each of the following functions.

$$16) f(x) = \frac{2x}{x+11}$$

$$(-\infty, -11) \cup (-11, \infty)$$

$$17) f(x) = \frac{\sqrt{x+1}}{x+1}$$

$$(-1, \infty)$$

$$18) f(x) = x^2 - 3x - 54$$

$$(-\infty, \infty)$$

$$19) f(x) = \frac{x+2}{x^2+11x+30} = \frac{x+2}{(x+6)(x+5)}$$

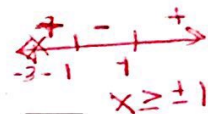
$$(-\infty, -6) \cup (-6, -5) \cup (-5, \infty)$$

$$20) f(x) = \frac{\sqrt{6x+1}}{x-5}$$

$$[-\frac{1}{6}, 5) \cup (5, \infty)$$

$$21) f(x) = \frac{\sqrt{x^2-1}}{x+3}$$

$$(-\infty, -3) \cup (-3, -1] \cup [1, \infty)$$



Determine each of the following and state the domain.

$$f(x) = x^2 - 4$$

$$D: [-4, \infty)$$

$$g(x) = \sqrt{x}$$

$$R: [-4, \infty)$$

$$h(x) = \frac{3}{x}$$

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

$$22) f(g(x))$$

$$= (\sqrt{x})^2 - 4$$

$$[0, \infty)$$

$$23) (g \circ f)(x)$$

$$= \sqrt{x^2 - 4}$$

$$(-\infty, -2] \cup [2, \infty)$$

$$24) (h \circ g)(x)$$

$$\frac{3}{\sqrt{x}}$$

$$(0, \infty)$$

$$25) \left(\frac{k}{h}\right)(x)$$

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

$$(-\infty, \infty)$$

$$26) \left(\frac{g}{k}\right)(x)$$

$$\frac{\sqrt{x}}{2x+3}$$

$$x \geq 0$$

$$x \neq -\frac{3}{2}$$

$$[0, \infty)$$

$$27) f(k(x))$$

$$(2x+3)^2 - 4$$

$$(-\infty, \infty)$$

$$28) (f - k)(x)$$

$$x^2 - 2x - 7$$

$$(-\infty, \infty)$$

$$29) k(f(x))$$

$$2(x^2 - 4) + 3$$

$$(-\infty, \infty)$$

$$30) g(h(x))$$

$$\sqrt{\frac{3}{x}} \left(\frac{\sqrt{x}}{\sqrt{x}}\right) = \frac{\sqrt{3x}}{x}$$

$$(0, \infty)$$

$$31) f^{-1}(x) \quad x = y^2 - 4$$

$$x + 4 = y^2$$

$$\pm \sqrt{x+4} = y$$

$$[-4, \infty)$$

$$32) (g \circ g)(x)$$

$$= \sqrt{\sqrt{x}}$$

$$[0, \infty)$$

$$33) k^{-1}(x)$$

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

$$(-\infty, \infty)$$

For each of the following.

- Determine if the function is one-to-one.
- Find the inverse of the function of the function.
- Then state the domain and range of the function and the inverse.

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



One to one

$$f(x) = (-\infty, 5) \cup (5, \infty) \text{ D}$$

$$(-\infty, 1) \cup (1, \infty) \text{ R}$$

$$f^{-1}(x) = \text{D } (-\infty, 1) \cup (1, \infty)$$

$$\text{R } (-\infty, 5) \cup (5, \infty)$$

$$x(y-5) = y+1 \Rightarrow y(x-1) = 5x+1$$

$$xy - 5x = y+1 \Rightarrow y^{-1} = \frac{5x+1}{x-1}$$

25)  $g(x) = \sqrt[3]{\frac{x-2}{4}} - 5$

right 2 down 5

$$(-\infty, \infty) \text{ D } \left\{ \begin{array}{l} g(x) \\ (-\infty, \infty) \text{ R} \end{array} \right.$$

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

$$x+5 = \sqrt[3]{\frac{y-2}{4}}$$

$$4(x+5)^3 + 2 = y^{-1}$$

$$g^{-1}(x) \text{ D } (-\infty, \infty)$$

$$\text{R } (-\infty, \infty)$$

26)  $j(x) = \sqrt{x-2}$

One to one

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

$$j(x) = \text{D } [2, \infty)$$

$$\text{R } [0, \infty)$$

$$j^{-1}(x) \text{ D } [0, \infty)$$

$$\text{R } [2, \infty)$$

Sketch each function and State the domain and range.

27)  $f(x) = x$

$$\text{D } (-\infty, \infty)$$

$$\text{R } (-\infty, \infty)$$

28)  $g(x) = -\sqrt{x+2}$

$$\text{D } [-2, \infty)$$

$$\text{R } (-\infty, 0]$$

29)  $f(x) = e^x + 3$

$$\text{D } (-\infty, \infty)$$

$$(3, \infty)$$

30)  $h(x) = (x-2)^2 + 5$

$$\text{D } (-\infty, \infty)$$

$$\text{R } [5, \infty)$$

31)  $m(x) = \frac{1}{x} - 2$

$$\text{D } (-\infty, 0) \cup (0, \infty)$$

$$\text{R } (-\infty, -2) \cup (-2, \infty)$$

32)  $y = -|x+1| + 4$

$$\text{D } (-\infty, \infty)$$

$$\text{R } (-\infty, 4]$$

