Sec 2.6.1
Determining domains

restrictions-

1) denominator cannot equal zero

2) even-rooted radicals cannot be negative

We will express using interval notation.

Determine the domain of-

$$f(x) = x^2 - 7x$$

$$d: (-\infty, \infty)$$

*verify with a graph?

Determine the domain of:

$$f(x) = \sqrt{3x+12}$$

is ok

$$3x+12 \geq 0$$

$$x \geq -4$$

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

*Again, a graph can be helpful to check, but you must show your algebraic work.

Determine the domain:

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

$x^2+2x-3 \neq 0$

$(x+3)(x-1)$

$x \neq -3 \quad x \neq 1$

$d: (-\infty, -3) \cup (-3, 1) \cup (1, \infty)$

*more difficult to graph, but you can
*the numerator and denominator need parenthesis
*vertical asymptotes might be difficult to identify
*asymptotes are reflected in the table

Determine the domain:

$$f(x) = \frac{3x-2}{\sqrt{14-2x}}$$

$$\begin{aligned} 14-2x &> 0 \\ -2x &> -14 \\ x &< 7 \end{aligned}$$

$d: (7, \infty)$

Determine the domain:

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

$x^2+1=0$

$\sqrt{x^2} = \sqrt{-1}$

$x = \pm i$

$x^2-1=0$

$x^2=1$

$x = \pm 1$

recall- denominators cannot equal zero

$d: (-\infty,-1) \cup (-1,1) \cup (1,\infty)$

Determine the domain:

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

Again, denominators cannot equal zero...and we have two of those here.

$\frac{3}{x} - 1 \neq 0$

$\frac{3}{x} \neq 1$

$3 \neq x$

$\frac{3}{x} \rightarrow x \neq 0$

$d: (-\infty, 0) \cup (0, 3) \cup (3, \infty)$

Determine the domain:

$$f(x) = \frac{2x+7}{x^3-5x^2-4x+20}$$

$$(x^3-5x^2)+(-4x+20) \neq 0$$

$$x^2(x-5) - 4(x-5) \neq 0$$

$$(x-5)(x^2-4) \neq 0$$

$$(x-5)(x+2)(x-2) \neq 0$$

$$x \neq 5, \pm 2$$

$$d: (-\infty, -2) \cup (-2, 2) \cup (2, 5) \cup (5, \infty)$$

Suggested Practice
Sec 2.6
page 297
1-29 odds

1. $(-\infty, \infty)$

3. $(-\infty, 4) \cup (4, \infty)$

5. $\mathbb{R}$

7. $(-\infty, -3) \cup (-3, 5) \cup (5, \infty)$

9. $(-\infty, -7) \cup (-7, 9) \cup (9, \infty)$

11. $(-\infty, -1) \cup (-1, 1) \cup (1, \infty)$

13. $(-\infty, 0) \cup (0, 3) \cup (3, \infty)$

15. $(-\infty, 1) \cup (1, 3) \cup (3, \infty)$

17. $[3, \infty)$

19. $(3, \infty)$

21. $[-7, \infty)$

23. $(-\infty, 12]$

25. $[2, \infty)$

27. $[2, 5) \cup (5, \infty)$

29. $(-\infty, -2) \cup (-2, 2) \cup (2, 5) \cup (5, \infty)$