Lesson 3.2.2

3-70. Answers vary. Be sure students understand that 1 is special because any non-zero number divided by itself is 1, and anything multiplied by 1 remains the same.

3-71. See below:

- a. H: $x \neq 0$; C: $\frac{16x}{16x} = 1$
- b. Yes, because $16x \cdot 1 = 16x$ (mult. ident.), so if $x \neq 0$, then $(16x) \div (16x) = 1$.
- c. To divide by zero means you are asking how many 0's does it take to make the number in the numerator? If the number you are trying to get is 0 there are infinitely many possible answers, otherwise there is no answer.
- d. Yes; $x \neq 3$
- e. Answers vary. Sample solutions: $\frac{x}{x}$, $\frac{x+5}{x+5}$, $\frac{n^2}{n^2}$
- f. Yes, because $\frac{z}{z} = 1$. The fact that anything multiplied by 1 stays the same is called the Identity Property of Multiplication.
 - $\int \frac{z}{z} \cdot \frac{x}{y} = \frac{x}{y}$
- **3-72.** Only when 0 is excluded as a possible value of x.

3-73. See below:

c. See graphs below.



d. $f_1: D: x \neq 1.5$, $R: f_1 = 1; f_2: D: x \neq 1.5$, $R: f_2 = -1; f_3: D: x \neq -1.5$, $R: f_3 \neq 1; f_4: D: x \neq 1.5$, $R: f_4 \neq 0$.

3-74. See below:

a. $1, x \neq 0$ b. $\frac{x}{3}, x \neq 0$ c. $\frac{x+5}{x-1}, x \neq 1 \text{ or } 2$ d. $1, x \neq 0$ e. $hk, h \neq 0$ f. $\frac{2m-5}{3m+1}, m \neq -6 \text{ or } -\frac{1}{3}$ g. $2(n-2), n \neq 2$ h. $\frac{1}{4x-1}, x \neq \frac{1}{4} \text{ or } \frac{3}{2}$

3-75. See below:

- a. Yes; you can tell by substituting any number (other than zero).
- b. No; you can tell by substituting a number (other than 1).
- c. They can be simplified like this when the numerator and denominator are single terms and are products of factors.
- d. (i) is not simplified correctly; (ii) is simplified correctly.

3-76. See below:



- b. $\frac{2x-5}{3x+1}$
- c. 1
- d. $\frac{x}{2}$



3-78. See below:

a. $\frac{x-4}{3x+2}$

b.
$$\frac{5}{x-3}$$

c. 2

3-79. See below:

- a. 1
- b. none
- c. 2
- d. 1

3-80. See below:

- a. x 2 = 4
- b. For each, x = 6
- c. x + 3 = 8, x = 5

3-81. See below:

- a. x < 0
- b. $x \le -4$

3-82. See below:

a. $\frac{3}{7}$ b. $\frac{5}{4}$

3-83. See graph below.



a. $y = x^3$; The vertex has been shifted up 4 and left 2.

b.
$$y = x^3 + 6x^2 + 12x + 12$$

c. It would not differ.

3-84. See graph below.



- a. Domain is all real numbers
- b. See graph below.



c. f(x) is a continuous function with range y > 0 while t(n) is a discrete series with positive integer inputs.