## 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. $\mathrm{H}: x \neq 0 ; \mathrm{C}: \frac{16 x}{16 x}=1$
b. Yes, because $16 x \cdot 1=16 x$ (mult. ident.), so if $x \neq 0$, then $(16 x) \div(16 x)=1$.
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.

$$
\sqrt{z} \cdot \frac{x}{y}=\frac{x}{y}
$$

3-72. Only when 0 is excluded as a possible value of $x$.

## 3-73. See below:

c. See graphs below.

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

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

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

$f(x)=\frac{1}{2 x-3}$
d. $f_{1}: \mathrm{D}: x \neq 1.5, \mathrm{R}: f_{1}=1 ; f_{2}: \mathrm{D}: x \neq 1.5, \mathrm{R}: f_{2}=-1 ; f_{3}: \mathrm{D}: x \neq-1.5, \mathrm{R}: f_{3} \neq 1 ; f_{4}: \mathrm{D}: x \neq 1.5, \mathrm{R}: f_{4} \neq 0$.

## 3-74. See below:

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


3-78. See below:
a. $\frac{x-4}{3 x+2}$
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. $x \leq-4$

## 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. $y=x^{3}+6 x^{2}+12 x+12$
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.

