Chapter 1: Review
Section 1: Functions
page 15: 1, 3, 5, 7, 19, 25

Section 2: Operations on Functions
page 27: 1, 5, 9, 21, 27, 29, 33, 51

Section 3: Linear Functions
page 40: 1, 3, 13, 17, 29, 31

Section 4: Exponents
page 45: 1, 7, 13, 17, 23

1.1
Memorize one of these or the equivalent.

Function
Function: A rule for a relationship between an input, or independent, quantity and an output, or dependent, quantity in which each input value uniquely determines one output value. We say "the output is a function of the input."

Definition: A function is a rule that associates to each element of one set, called the domain, a unique corresponding element in another set (which could be identical to the original set), called the range.

Memorize

Function Notation
The notation output = *f*(input) defines a function named *f*.
This would be read "output is *f* of input"

Example $f(x) = x^2, \quad x \in \mathbb{R}$

x is an element, or member, of the set all real numbers

1.3
Memorize

Laws of Exponents:

Laws of Exponents:
All variables here represent real numbers and all variables in denominators are nonzero.

1) $x^a \cdot x^b = x^{a+b}$

2) $\frac{x^a}{x^b} = x^{a-b}$

3) $\left(x^a\right)^b = x^{ab}$

4) $(xy)^a = x^a y^a$

5) $\left(\frac{x}{y}\right)^b = \frac{x^b}{y^b}$

6) $x^0 = 1$, provided $x \neq 0$

7) $x^{-n} = \frac{1}{x^n}$, provided $x \neq 0$

8) $x^{1/n} = \sqrt[n]{x}$, provided $x \neq 0$

$2^3 \cdot 2^2 = (2 \times 2 \times 2)(2 \times 2)$

$= 2 \times 2 \times 2 \times 2 \times 2$

$= 2^5$

$= 2^{3+2}$

$\frac{2^5}{2^2} = \frac{2 \cdot 2 \cdot 2 \cdot 2 \cdot 2}{2 \cdot 2}$

$= 2^3 = 2^{5-2}$

$(2^3)^2 = (2^3)(2^3)$

$= 2^{3+3} = 2^6 = 2^{(3)(2)}$

$\frac{2^3}{2^3} = \frac{8}{8} = 1$

$2^{3-3} = 2^0$

by rule $\frac{2^3}{2^3} = 2^{3-3} = 2^0$

To keep our beautiful rule

<u>define</u> $2^0 = 1$

$$\frac{2^2}{2^4} = \frac{\cancel{2}\cdot\cancel{2}}{\cancel{2}\cdot\cancel{2}\cdot 2\cdot 2} = \frac{1}{2^2}$$

rule: $\frac{2^2}{2^4} = 2^{2-4} = 2^{-2}$

define $2^{-2} = \frac{1}{2^2}$

$$\boxed{b^{-n} = \frac{1}{b^n}}$$

$$\frac{2^3}{2^2} = \frac{8}{4} = 2$$

b rule $\frac{2^3}{2^2} = 2^{3-2} = 2^1$

Defin $2^1 = 2$

$$\boxed{b^1 = b}$$

$b^{\frac{1}{2}} \cdot b^{\frac{1}{2}} = b^{\frac{1}{2}+\frac{1}{2}} = b^1 = b$

$\sqrt{b}\sqrt{b} = b$

Define $b^{\frac{1}{2}} = \sqrt{b}$