Section 3.6 Guided Notebook

Section 3.6 One-to-one Functions; Inverse Functions

☐   Work through Objective 1
☐   Work through Objective 2
☐   Work through Objective 3
☐   Work through Objective 4
☐   Work through Objective 5

Section 3.6 One-To-One Functions; Inverse Functions

Introduction to Section 3.6

In your own words, what does the function $F(C) = \dfrac{9}{5}C + 32$ represent?

In your own words, what does the function $C(F) = \dfrac{5}{9}(F - 32)$ represent?

If $F(C) = \dfrac{9}{5}C + 32$, then evaluate $F(100)$. What does mean $F(100)$?

If $C(F) = \dfrac{5}{9}(F - 32)$, then evaluate $C(212)$. What does mean $C(212)$?

What is the value of $C(F(100))$?

What is the value of $F(C(212))$?

Section 3.6 Objective 1 Understanding the Definition of a One-to-One Function
Work through the video that accompanies Objective 1 and write notes here.

      Write down the definition of a **one-to-one function:**

      Give an example of a function that is one-to-one.

      Give an example of a function that is **not** one-to-one.

Write down the **Alternate Definition of a One-to-One Function** as seen in the eText.

Section 3.6 Objective 2 Determining If a Function is One-to-One Using the Horizontal Line Test
Work through the video that accompanies Objective 2 and write notes here.

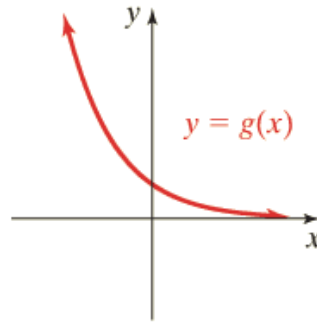Write down the **Horizontal Line Test** and write down the 3 examples seen in the video.

Section 3.6

Work through the animation that accompanies Example 1 and take notes here:
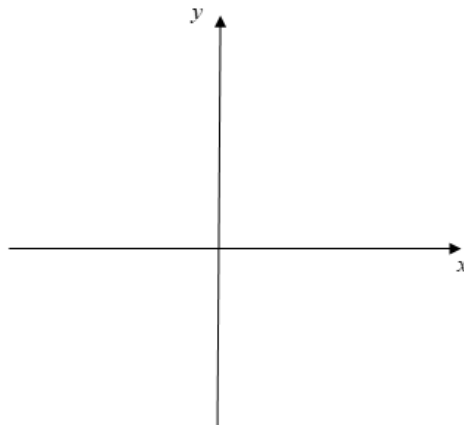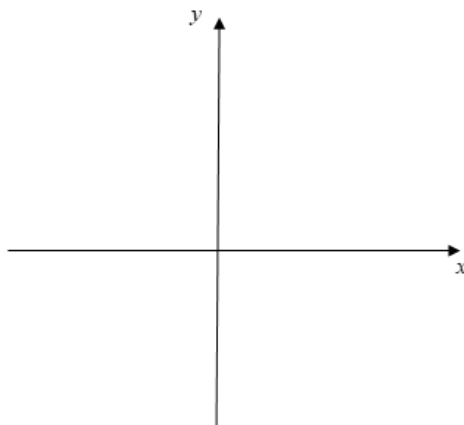Determine whether each function is one-to-one.

a.

$y = f(x)$

b.

$y = g(x)$
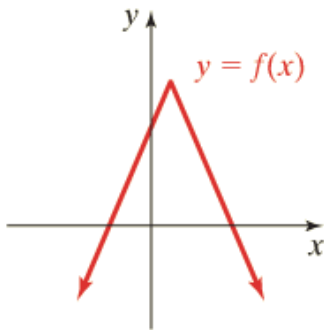
c. $f(x) = x^2 + 1, x \le 0$ (You must sketch the graph of this function.)

d. $f(x) \begin{cases} 2x + 4 & \text{for} \quad x \le -1 \\ 2x - 6 & \text{for} \quad x \ge 4 \end{cases}$ (You must sketch the graph of this function.)

Section 3.6 Objective 3 Understanding and Verifying Inverse Functions
Work through the video that accompanies Objective 3 and write notes here.

Write down the definition of an **inverse function.**

Write down the example of the one-to-one function and the inverse function given in this video.

Watch the video that follows Figure 27 on page 3.6-10 and take notes here:

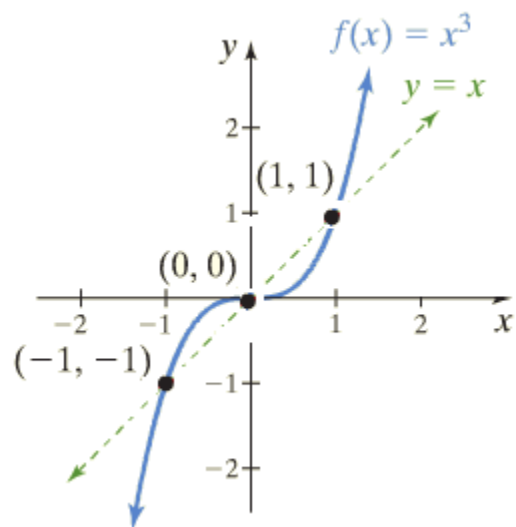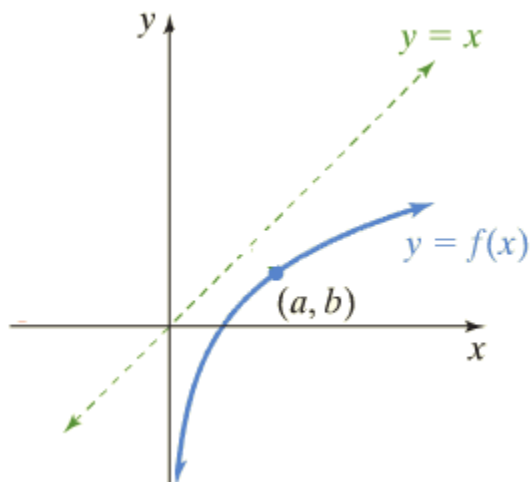Write down the two **Composition Cancellation Equations**:

Work through the interactive video that accompanies Example 2 and take notes here:

Show that $f(x) = \dfrac{x}{2x+3}$ and $g(x) = \dfrac{3x}{1-2x}$ are inverse functions using the composition cancellation equations.

Section 3.6 Objective 4 Sketching the Graphs of Inverse Functions
Read through Objective 4 and describe in your own words how to sketch the graph of the inverse of a given one-to-one function.

Below are the graphs of two one-to-one functions. Sketch the graphs of their inverse functions.

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Work through the animation that accompanies Example 3:

Sketch the graph of $f(x) = x^2 + 1$, $x \leq 0$, and its inverse. Also state the domain and range of f and f^{-1}.

Click on the **Guided Visualization** titled "Sketching the Graphs of Inverse Functions" found on page 3.6-15. For each graph below, sketch the graph of $y = x$, sketch and label the graph of the inverse function, include at least one ordered pair that lies on the graph of f, and include at least one ordered pair that lies on the graph of f^{-1}.

$$f(x) = \sqrt{x+4}$$

$$f(x) = 0.2x^3 - 2$$

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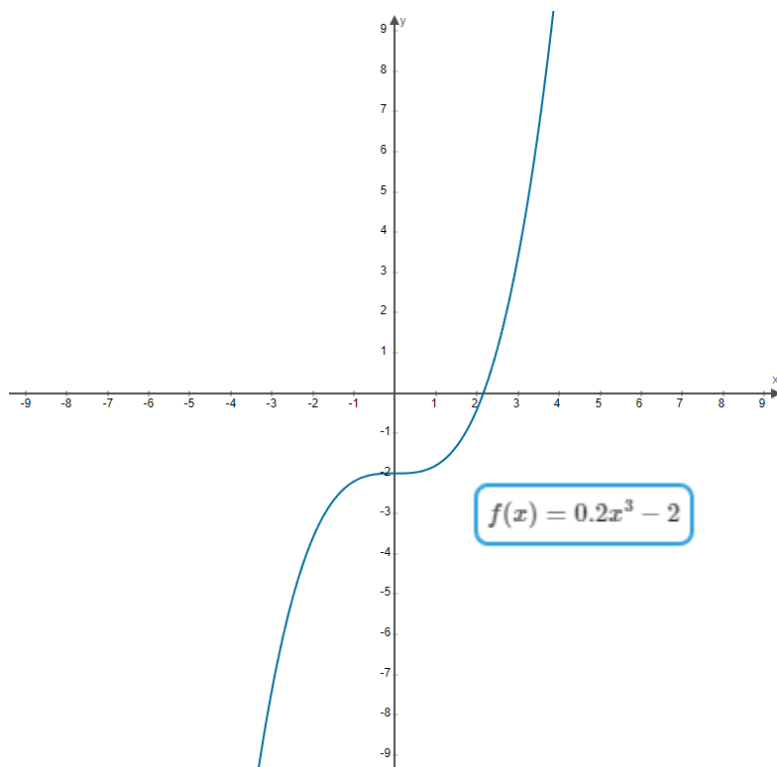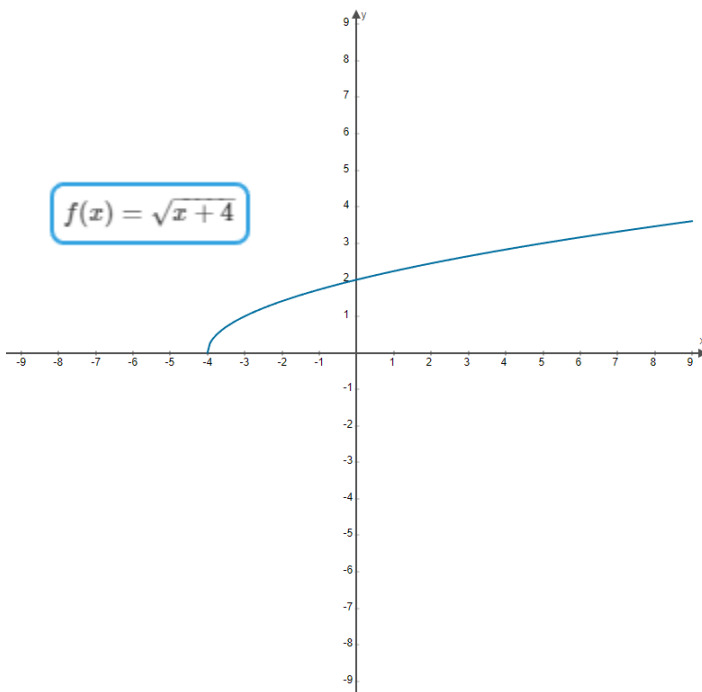
Section 3.6 Objective 5 Finding the Inverse of a One-to-One Function

Work through the animation that accompanies Example 4: Find the inverse function of
$f(x) = \dfrac{2x}{1-5x}$ and state the domain and range of f and f^{-1}

Step 1. Change $f(x)$ to y :

Step 2. Interchange x and y :

Step 3: Solve for y:

Step 4: Change y to $f^{-1}(x)$:

Write the domain and range of f and f^{-1}.

Work through the video that accompanies Example 5.

Find the inverse of $f(x) = x^2 + 1$, $x \leq 0$. Write down the four steps for finding inverse

functions as you find the inverse of $f(x) = x^2 + 1$, $x \leq 0$

Steps for Finding the Equation of an Inverse Function

Step 1:

Step 2:

Step 3:

Step 4:

In your own words, explain the relationship between the domain and range of a one-to-one function and its inverse function:

Use the **Inverse Function Summary** to complete the following statements:

1. The function f^{-1} exists if and only if…

2. The domain of f is the same as the…

    And the range of f is the same as the…

3. To verify that two one-to-one functions, f and g, are inverses of each other, we must…

4. The graph of f^{-1} is a reflection of …

    That is, for any point (a, b) that lies on the graph of f, the point (b, a) must…

5. To find the inverse of a one-to-one function, …