Section 3.2 Guided Notebook

Section 3.2 Properties of a Function's Graph

- ☐   Work through Objective 1
- ☐   Work through Objective 2
- ☐   Work through Objective 3
- ☐   Work through Objective 4
- ☐   Work through Objective 5
- ☐   Work through Objective 6

Section 3.2 Properties of a Function's Graph

<u>3.2 Things To Know</u>

Take a few moments to work through each of the four Things to Know objectives. You must have a solid understanding of each of these topics in order to fully understand the material presented in Section 3.2. You may want to work through each of the "You Try It" problems and review the material as needed before going on. Take notes here if necessary:

Section 3.2 Objective 1 Determining the Intercepts of a Function

Work through the video that accompanies Objective 1 and fill in the notes below:

Define **y-intercept**:

Define **x-intercept**:

Given a function $f(x)$, how can we find the intercepts?

Show how to find the intercepts of the functions $f(x) = -3x + 2$ and $g(x) = x^3 - x^2 - 12x$.

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Work through the video that accompanies Example 2 and show your work here:

Given the functions below, find the x-intercept(s) and the y-intercept (if they exist).
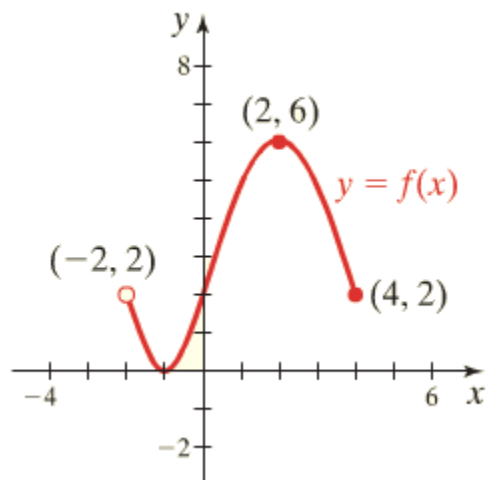
a. $f(x) = x^3 - 2x^2 + x - 2$

b. $g(x) = \dfrac{2x^2 - 7x - 4}{x^3}$

Section 3.2 Objective 2 Determining the Domain and Range of a Function from Its Graph

Watch the video that accompanies Objective 2 and take notes here:

The examples seen in the video are the **same** graphs used in Example 3:
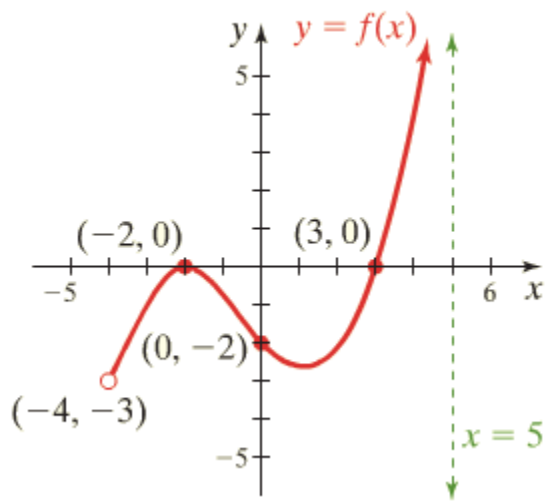Find the domain and range of the functions seen below:
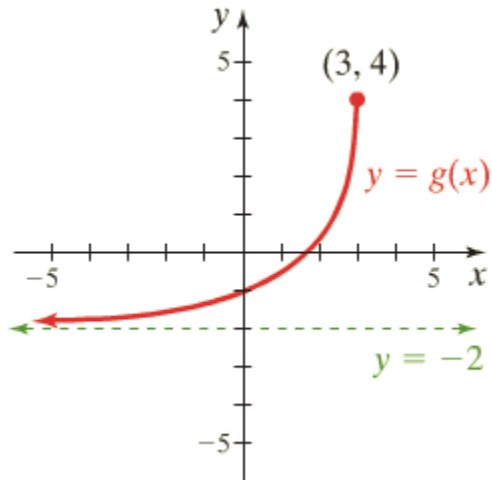
a.

Domain:

Range:

b.

Domain:

Range:

c.

(3, 4)

$y = g(x)$

$y = -2$

Domain:

Range:

What is the definition of a **vertical asymptote**? (See the link in the solution to Example 3 part b.)

What is the definition of a **horizontal asymptote**? (See the link in the solution to Example 3 part c.)

Section 3.2 Objective 3 Determining Whether a Function is Increasing, Decreasing, or Constant
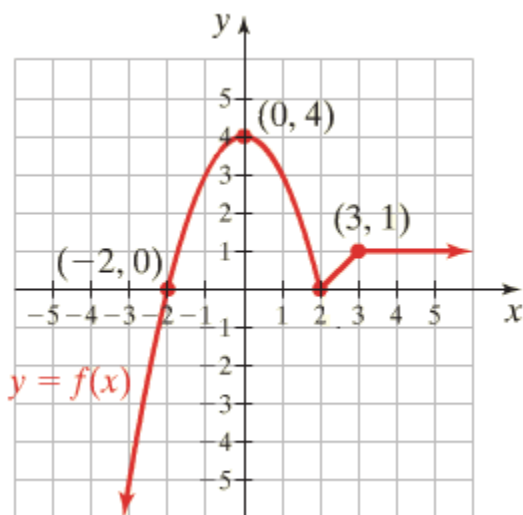
Watch the video that accompanies Objective 3 and fill in the following definitions:

Increasing:

Decreasing:

Constant

Watch the video that accompanies Example 4 and determine the intervals on which the function seen below is increasing, decreasing, and constant: (**THE INTERVAL(S) ARE ALWAYS *X*-INTERVALS.)**

The function is increasing on the interval(s):

The function is decreasing on the interval(s):

The function is constant on the interval(s):

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Section 3.2 Objective 4 Determining Relative Maximum and Relative Minimum Values of a Function

Watch the video that accompanies Objective 4 and fill in the following definitions:
     Relative Maximum:

     Relative Minimum:

Work through the video that accompanies Example 5 and answer each of the following questions:
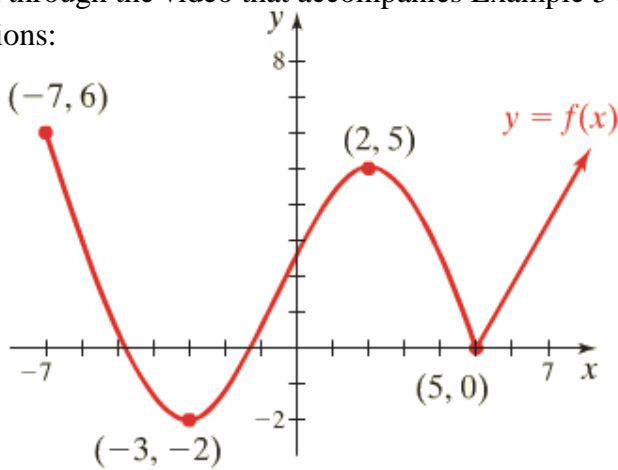
a. On what interval(s) is f increasing?

b. On what interval(s) is f decreasing?

c. For what value(s) of x does f have a relative minimum?

d. For what value(s) of x does f have a relative maximum?

e. What are the relative minima?

f. What are the relative maxima?

Section 3.2 Objective 5 Determining Whether a Function is Even, Odd, or Neither

Watch the video that accompanies Objective 5 and fill in the following definitions:

Even Functions:

(Draw an example of an even function here.)

Odd Functions:

(Draw an example of an odd function here.)

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Summarize Even and Odd Functions by filling in the following Table.

TYPE OF FUNCTION	ALGEBRAIC DEFINITION	TYPE OF SYMMETRY (Write y-axis or origin symmetry.)
Even	$f(-x) = $ _____	
Odd	$f(-x) = $ _____	

Work through Example 6:

Determine whether each function is even, odd, or neither. (Explain in your own words why each function is even, odd, or neither.)

a.

b.

c.
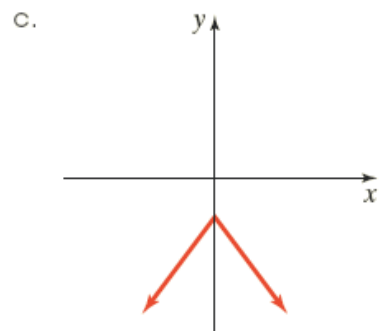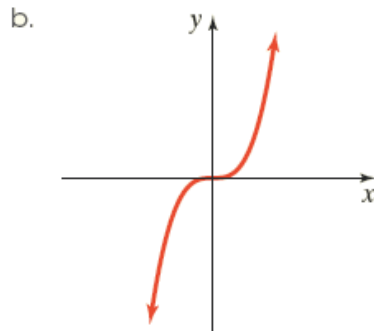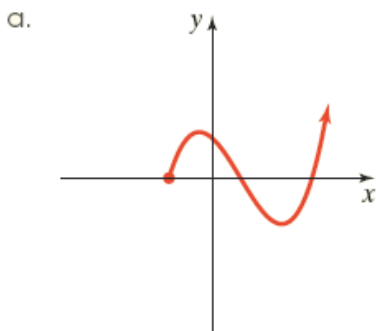
You do NOT need the graph of a function to determine if it is even, odd, or neither!

Carefully, work through the video that accompanies Example 7 and determine (WITHOUT GRAPHING) whether each of the following functions is even, odd, or neither:

a. $f(x) = x^3 + x$
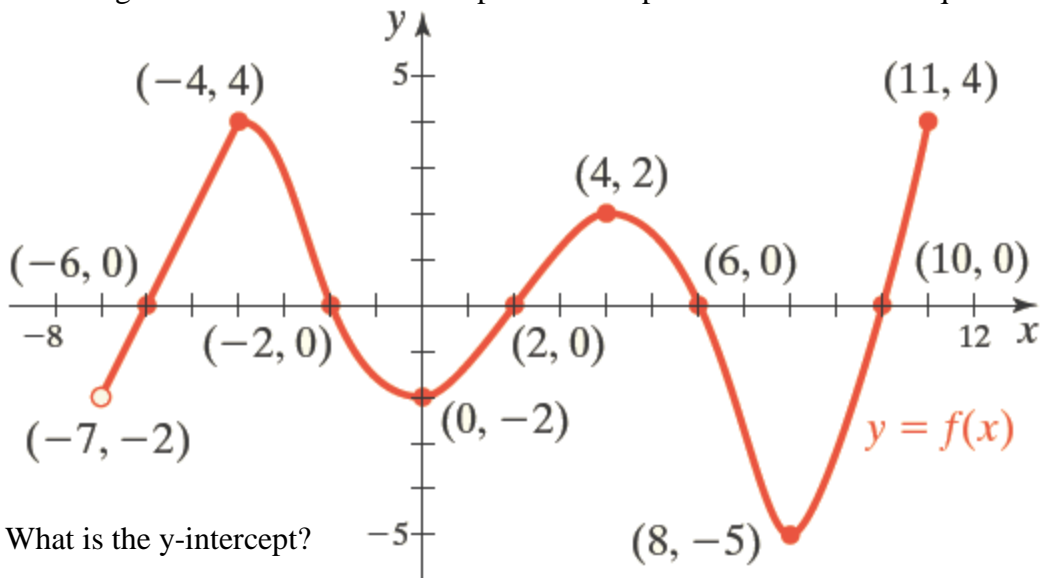
b. $g(x) = \dfrac{1}{x^2} + 7|x|$

c. $h(x) = 2x^5 - \dfrac{1}{x}$

d. $G(x) = x^2 + 4x$

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Section 3.2 Objective 6 Determining Information about a Function from a Graph
Work through the animation that accompanies Example 8 and answer each question:

a. What is the y-intercept?

b. What are the real zeros of f?

c. Determine the domain and range of f.

d. Determine the interval(s) on which f is increasing, decreasing and constant.

e. For what value(s) of x does f obtain a relative maximum? What are the relative maxima?

f. For what value(s) of x does f obtain a relative minimum? What are the relative minima?

g. Is f even, odd, or neither?

h. For what values of x is $f(x) = 4$?

i. For what values of x is $f(x) < 0$?