



Is the graph even or odd?

odd

What are the x intercepts?

-3, 0, 3

What are the y intercepts?

0

What intervals is it increasing?

$(-\infty, -2)$ $(2, \infty)$

What intervals is it decreasing?

$(-2, 2)$

State the Local Maxima and Local Minima.

Max: $f(-2) = 10$

Min: $f(2) = -10$

SECTIONS 2.4

LIBRARY OF FUNCTIONS: PIECEWISE-DEFINED FUNCTIONS

homework

P.96

**#4, 9-16, 18,
20, 22, 24**

OBJECTIVE 1

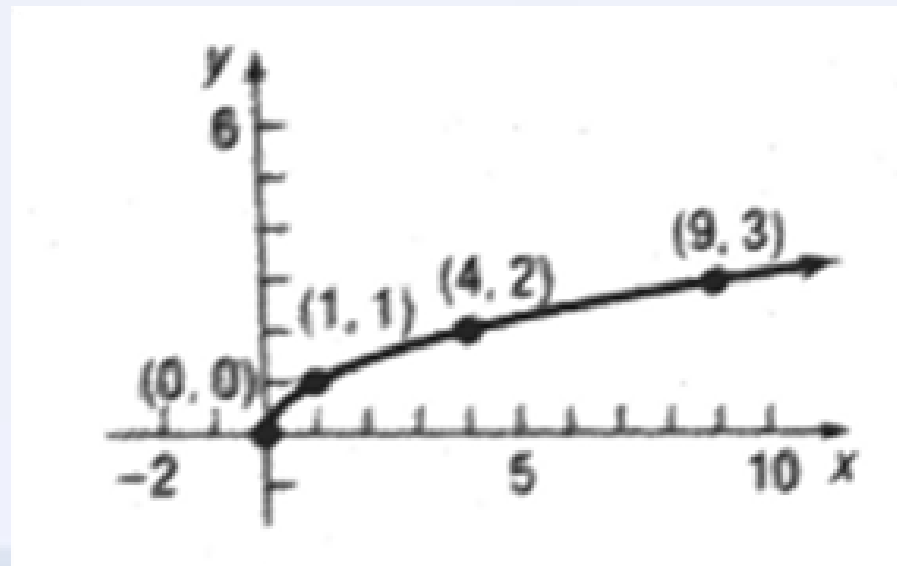
**GRAPH THE FUNCTIONS LISTED IN THE
LIBRARY OF FUNCTIONS.**

The Square Root Function

$(0 < x < \infty)$
 $(0 < y < \infty)$

Properties of $f(x) = \sqrt{x}$

1. The domain and the range are the set of nonnegative real numbers.
2. The x -intercept of the graph of $f(x) = \sqrt{x}$ is 0. The y -intercept of the graph of $f(x) = \sqrt{x}$ is also 0.
3. The function is neither even nor odd.
4. It is increasing on the interval $(0, \infty)$.
5. It has a minimum value of 0 at $x = 0$.



Example...

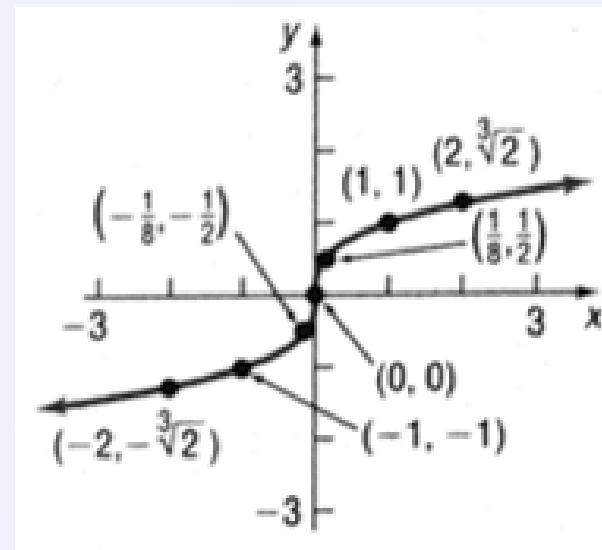
Graphing the Cube Root Function

EXAMPLE 1

Graphing the Cube Root Function

- (a) Determine whether $f(x) = \sqrt[3]{x}$ is even, odd, or neither. State whether the graph of f is symmetric with respect to the y -axis or symmetric with respect to the origin. *odd, symmetric to the origin*
- (b) Determine the intercepts, if any, of the graph of $f(x) = \sqrt[3]{x}$. *x-int is 0, y-int = 0*
- (c) Graph $f(x) = \sqrt[3]{x}$.

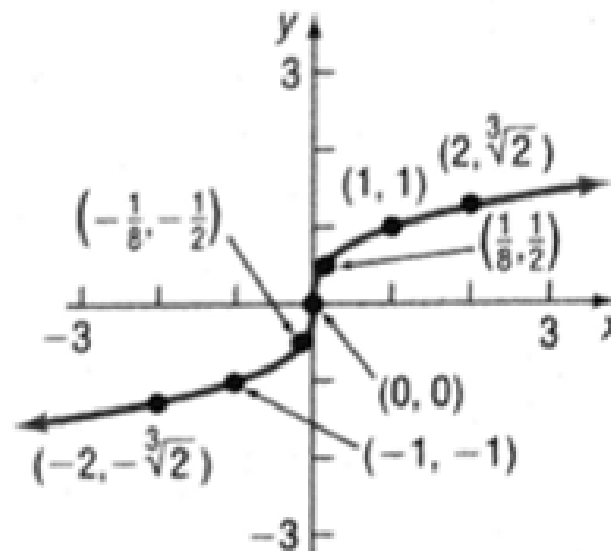
x	$y = f(x) = \sqrt[3]{x}$	(x, y)
0	0	(0, 0)
$\frac{1}{8}$	$\frac{1}{2}$	$(\frac{1}{8}, \frac{1}{2})$
1	1	(1, 1)
2	$\sqrt[3]{2} \approx 1.26$	$(2, \sqrt[3]{2})$
8	2	(8, 2)



The Cube Root Function

Properties of $f(x) = \sqrt[3]{x}$

1. The domain and the range are the set of all real numbers.
2. The x -intercept of the graph of $f(x) = \sqrt[3]{x}$ is 0. The y -intercept of the graph of $f(x) = \sqrt[3]{x}$ is also 0.
3. The graph is symmetric with respect to the origin. The function is odd.
4. It is increasing on the interval $(-\infty, \infty)$.
5. It does not have a local minimum or a local maximum.



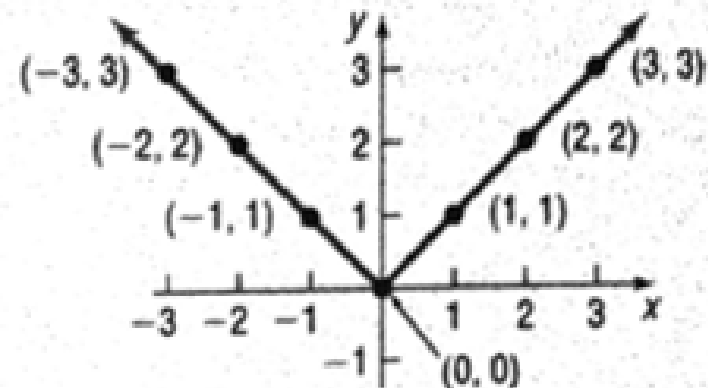
Example...

Graphing the Absolute Value Function

- (a) Determine whether $f(x) = |x|$ is even, odd, or neither. State whether the graph of f is symmetric with respect to the y -axis or symmetric with respect to the origin. *even, symmetrical w/ respect to y-axis.*
- (b) Determine the intercepts, if any, of the graph of $f(x) = |x|$.
- (c) Graph $f(x) = |x|$. *x-int = 0, y-int = 0*

x	$y = f(x) = x $	(x, y)
0	0	(0, 0)
1	1	(1, 1)
2	2	(2, 2)
3	3	(3, 3)

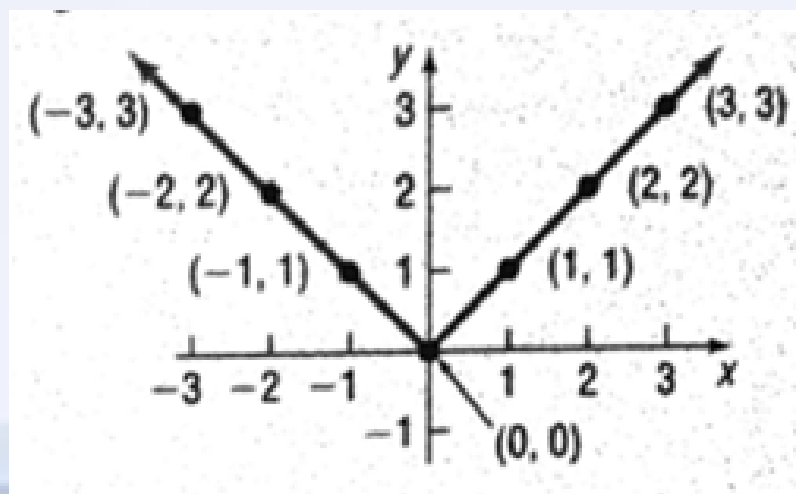
Figure 31



The Absolute Value Function

Properties of $f(x) = |x|$

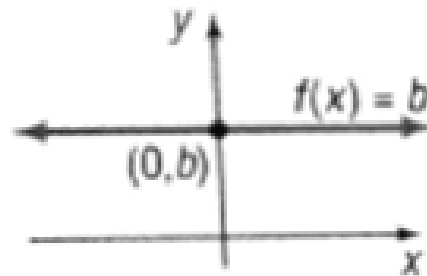
1. The domain is the set of all real numbers. The range of f is $\{y|y \geq 0\}$.
2. The x -intercept of the graph of $f(x) = |x|$ is 0. The y -intercept of the graph of $f(x) = |x|$ is also 0.
3. The graph is symmetric with respect to the y -axis. The function is even.
4. It is decreasing on the interval $(-\infty, 0)$. It is increasing on the interval $(0, \infty)$.
5. It has a local minimum of 0 at $x = 0$.



Constant Function

$$f(x) = b \quad b \text{ is a real number}$$

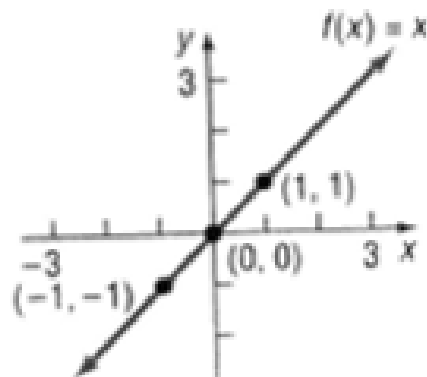
Constant Function



Identity Function

$$\underline{f(x) = x}$$

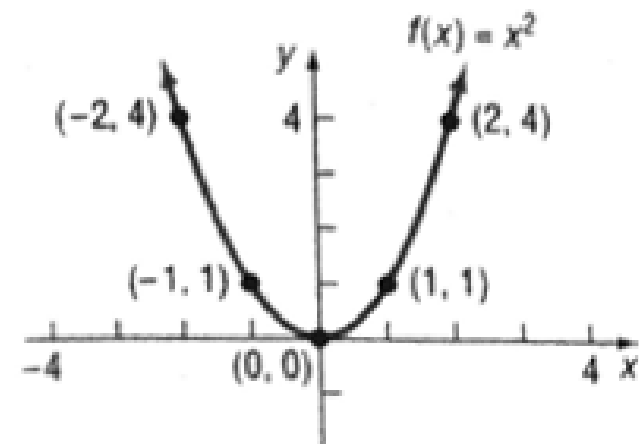
Identity Function



Square Function

$$\underline{f(x) = x^2}$$

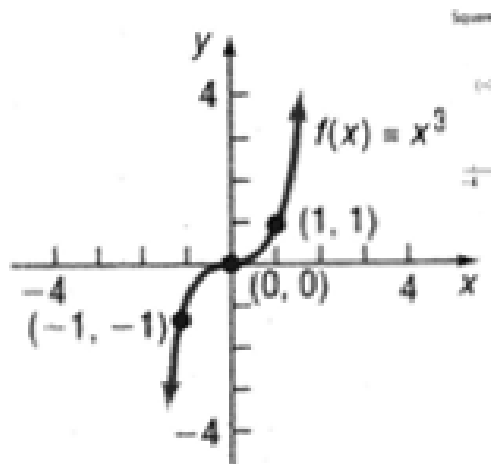
Square Function



Cube Function

$$f(x) = \sqrt[3]{x}$$

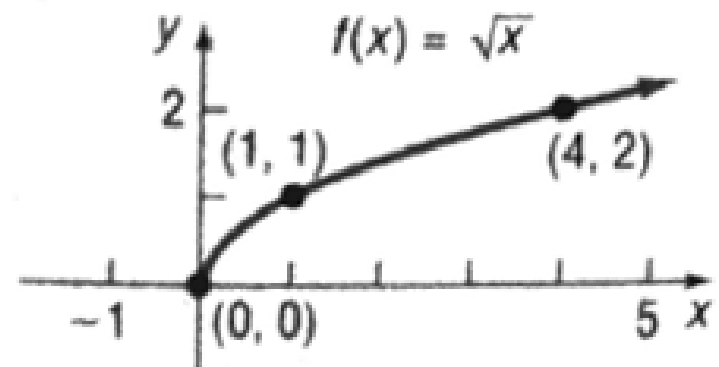
Cube Function



Square Root Function

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

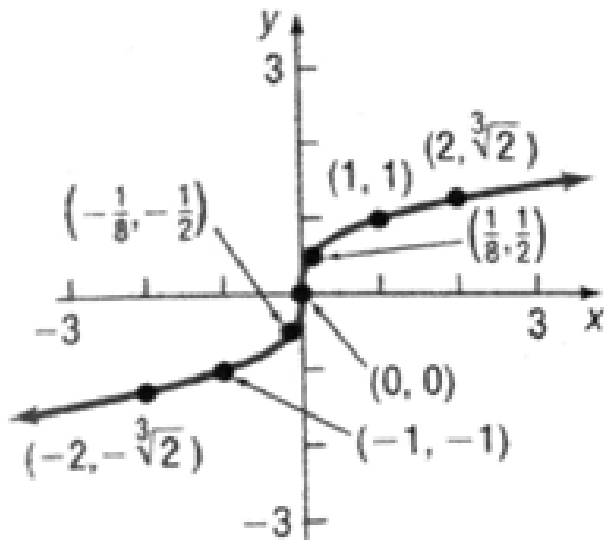
Square Root Function



Cube Root Function

$$f(x) = \sqrt[3]{x}$$

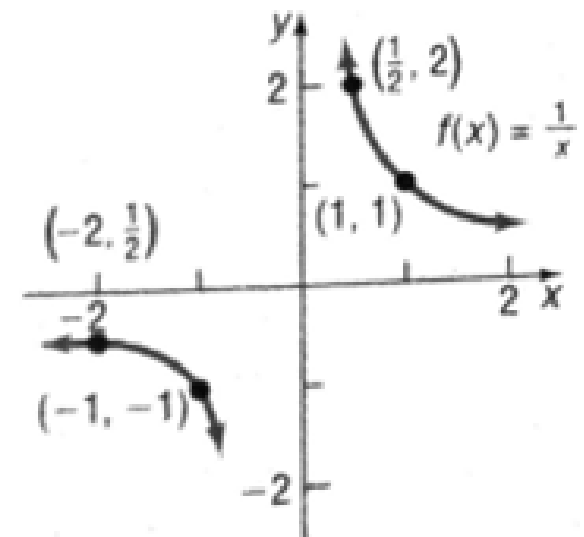
Cube Root Function



Reciprocal Function

$$f(x) = \frac{1}{x}$$

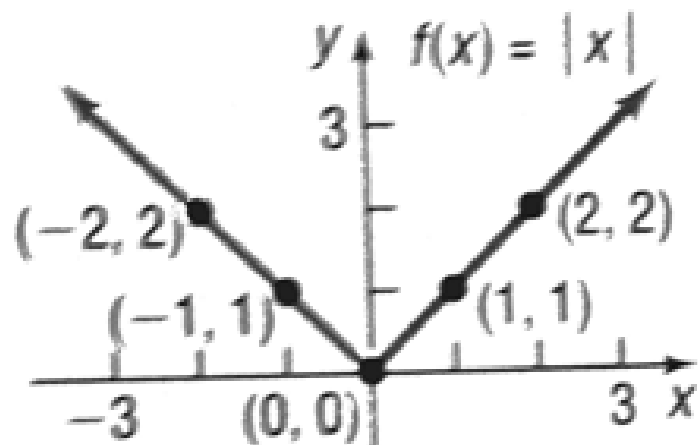
Reciprocal Function



Absolute Value Function

$$f(x) = |x|$$

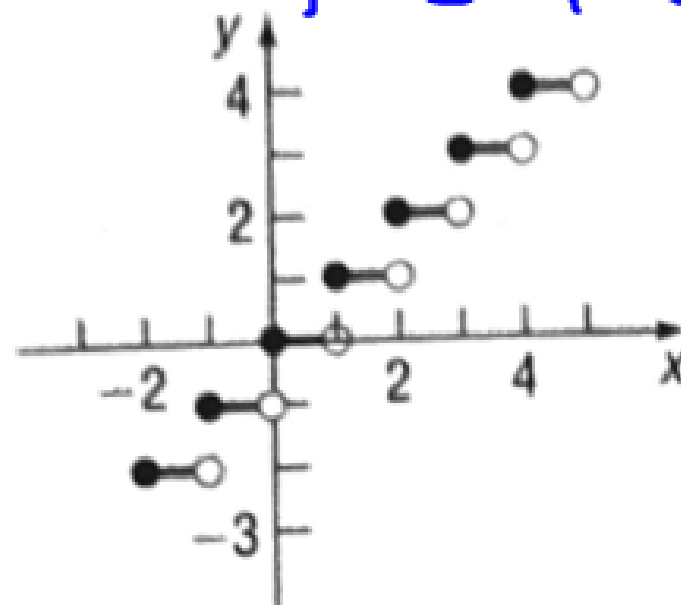
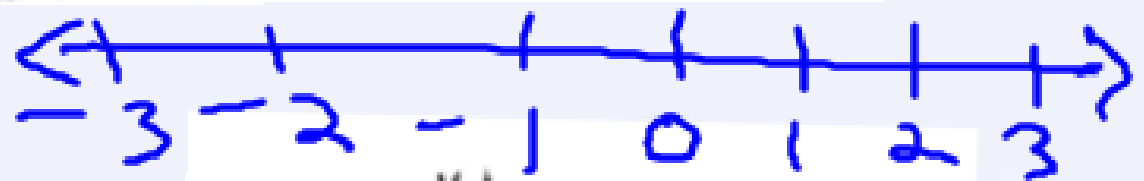
Absolute Value Function



Greatest Integer Function

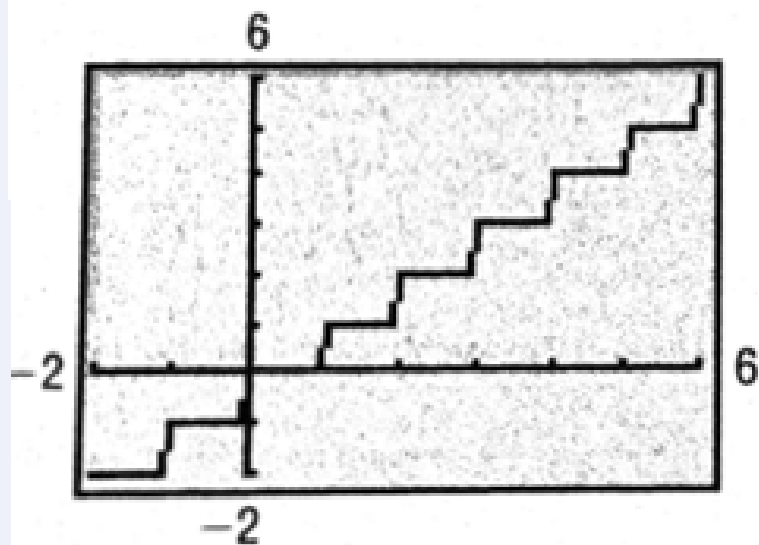
$f(x) = \text{int}(x)^*$ = greatest integer less than or equal to x

x	$y = f(x)$ = $\text{int}(x)$	(x, y)
-1	-1	$(-1, -1)$
$-\frac{1}{2}$	-1	$(-\frac{1}{2}, -1)$
$-\frac{1}{4}$	-1	$(-\frac{1}{4}, -1)$
0	0	$(0, 0)$
$\frac{1}{4}$	0	$(\frac{1}{4}, 0)$
$\frac{1}{2}$	0	$(\frac{1}{2}, 0)$

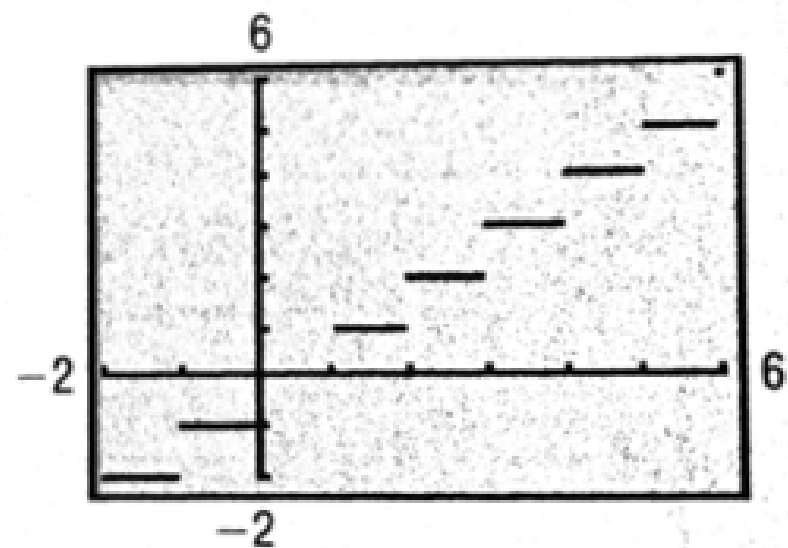


Greatest Integer Function

$f(x) = \text{int}(x)^*$ = greatest integer less than or equal to x



(a) Connected mode



(b) Dot mode

homework

P.96

#4, 9-16, 18,
20, 22, 24