NAME ______________________ DATE ______________ PERIOD ________

6-3 Study Guide and Intervention

Square Root Functions and Inequalities

Square Root Functions A function that contains the square root of a variable expression is a **square root function**. The domain of a square root function is those values for which the radicand is greater than or equal to 0.

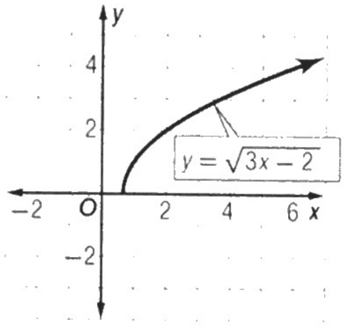
Example: Graph $y = \sqrt{3x - 2}$. State its domain and range.

Since the radicand cannot be negative, the domain of the function is $3x - 2 \geq 0$ or $x \geq \frac{2}{3}$.

The x-intercept is $\frac{2}{3}$. The range is $y \geq 0$.

Make a table of values and graph the function.

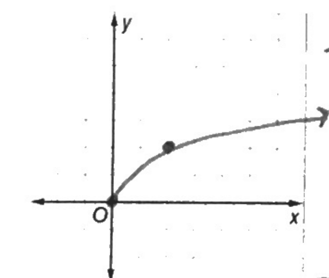
x	y
$\frac{2}{3}$	0
1	1
2	2
3	$\sqrt{7}$



Exercises

Graph each function. State the domain and range.

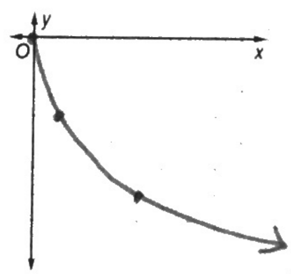
1. $y = \sqrt{2x}$



X	y
0	0
2	2

D: $x \geq 0$
R: $y \geq 0$

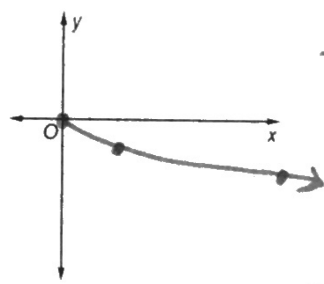
2. $y = -3\sqrt{x}$



X	y
0	0
1	-3
4	-6

D: $x \geq 0$
R: $y \leq 0$

3. $y = -\sqrt{\frac{x}{2}}$

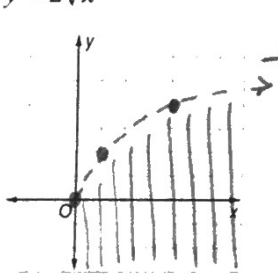


X	y
0	0
2	-1
8	-2

D: $x \geq 0$
R: $y \leq 0$

Graph each inequality.

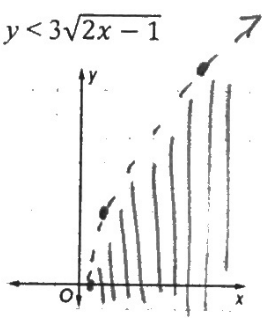
1. $y < 2\sqrt{x}$



X	y
0	0
1	2
4	4

D: $x \geq 0$
R: $y \leq 2\sqrt{x}$

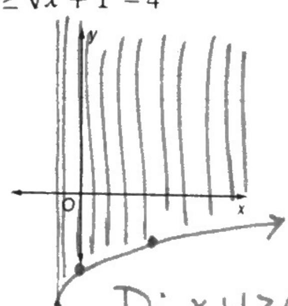
2. $y < 3\sqrt{2x - 1}$



X	y
½	0
1	3
5	9

D: $\cancel{2}x - 1 \geq 0$
$x \geq 1/2$
R: $y < 3\sqrt{2x-1}$

3. $y \geq \sqrt{x + 1} - 4$



X	y
-1	-4
0	-3
3	-2

D: $x + 1 \geq 0$
$x \geq -1$
R: $y \geq \sqrt{x+1} - 4$

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6-4 Study Guide and Intervention
*n*th Roots

Simplify Radicals

Square Root	For any real numbers *a* and *b*, if $a^2 = b$, then *a* is a square root of *b*.
***n*th Root**	For any real numbers *a* and *b*, and any positive integer *n*, if *an* = *b*, then *a* is an *n*th root of *b*.
Real *n*th Roots of *b*, $\sqrt[n]{b}, -\sqrt[n]{b}$	1. If *n* is even and *b* > 0, then *b* has one positive real root and one real negative root. 2. If *n* is odd and *b* > 0, then *b* has one positive real root. 3. If *n* is even and *b* < 0, then *b* has no real roots. 4. If *n* is odd and *b* < 0, then *b* has one negative real root.

Example 1: Simplify $\sqrt{49z^8}$.

$\sqrt{49Z^8} = \sqrt{(7z^4)^2} = 7z^4$

z^4 must be positive, so there is no need to take the absolute value.

Example 2: Simplify $-\sqrt[3]{(2a-1)^6}$

$-\sqrt[3]{(2a-1)^6} = \sqrt[3]{[(2a-1)^2]^3} = -(2a-1)^2$

Exercises

Simplify.

1. $\sqrt{81}$

9

2. $\sqrt[3]{-343}$

-7

3. $\sqrt{144p^6}$

$12p^3$

4. $\pm\sqrt{4a^{10}}$

$\pm 2a^5$

5. $\sqrt[5]{243p^{10}}$

$3p^2$

6. $-\sqrt[3]{m^6n^9}$

$-m^2n^3$

Use a calculator to approximate each value to three decimal places.

1. $\sqrt{62}$

7.87

2. $\sqrt{1050}$

32.404

3. $\sqrt[3]{0.054}$

0.378

4. $-\sqrt[4]{5.45}$

-1.290

5. $\sqrt{5280}$

72.663

6. $\sqrt{18{,}600}$

136.382