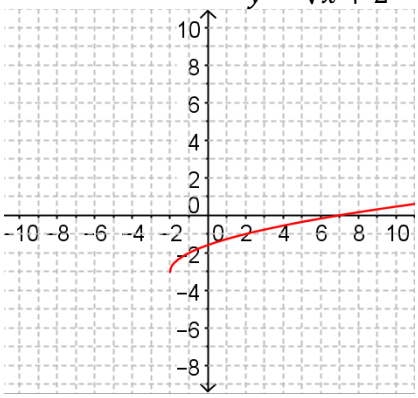
Name: _____

SM3 6.3: Graphing Radical Functions

Graph each function. Then identify the listed properties. Show all work.

1) $y = \sqrt{x+2} - 3$



x-int: let $y = 0$

$0 = \sqrt{x+2} - 3$

$3 = \sqrt{x+2}$

$9 = x + 2$

$x = 7$

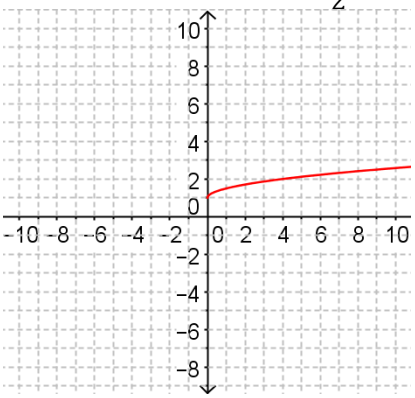
y-int: let $x = 0$

$y = \sqrt{0+2} - 3$

$y = \sqrt{2} - 3$

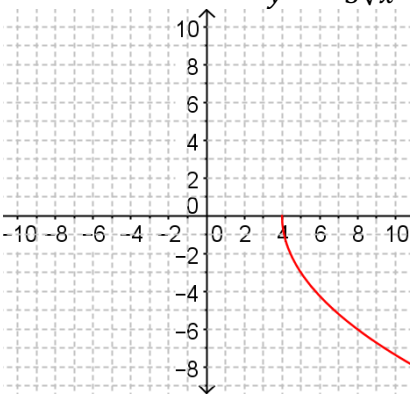
Domain:	$[-2, \infty)$
Range:	$[-3, \infty)$
Max/Min:	$(-2, -3)$
x-intercept(s):	$(7, 0)$
y-intercept:	$(0, \sqrt{2} - 3)$
Increasing:	$(-2, \infty)$
Decreasing:	$\emptyset$
Positive:	$(7, \infty)$
Negative:	$[-2, 7)$

2) $y = \frac{1}{2}\sqrt{x} + 1$



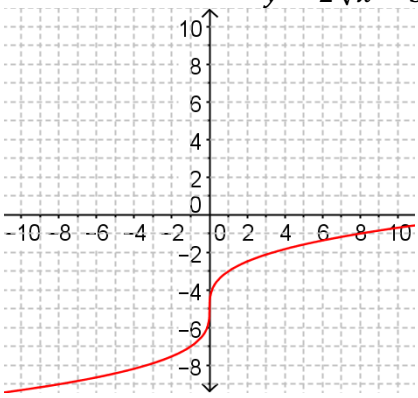
Domain:	$[0, \infty)$
Range:	$[1, \infty)$
Max/Min:	$(0, 1)$
x-intercept(s):	$\emptyset$
y-intercept:	$(0, 1)$
Increasing:	$(0, \infty)$
Decreasing:	$\emptyset$
Positive:	$[0, \infty)$
Negative:	$\emptyset$

3) $y = -3\sqrt{x-4}$



Domain:	$[4, \infty)$
Range:	$(-\infty, 0]$
Max/Min:	$(4, 0)$
x-intercept(s):	$(4, 0)$
y-intercept:	$\emptyset$
Increasing:	$\emptyset$
Decreasing:	$(4, \infty)$
Positive:	$\emptyset$
Negative:	$(4, \infty)$

4) $y = 2\sqrt[3]{x} - 5$



x-int: let $y = 0$

$0 = 2\sqrt[3]{x} - 5$

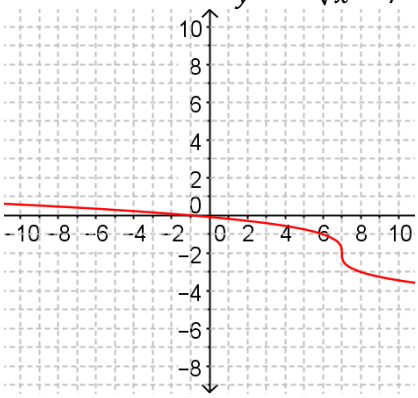
$5 = 2\sqrt[3]{x}$

$\frac{5}{2} = \sqrt[3]{x}$

$x = \left(\frac{5}{2}\right)^3 = \frac{125}{8}$

Domain:	$\mathbb{R}$
Range:	$\mathbb{R}$
Max/Min:	$\emptyset$
x-intercept(s):	$\left(\frac{125}{8}, 0\right)$
y-intercept:	$(0, -5)$
Increasing:	$\mathbb{R}$
Decreasing:	$\emptyset$
Positive:	$\left(\frac{125}{8}, \infty\right)$
Negative:	$\left(-\infty, \frac{125}{8}\right)$

5) $y = -\sqrt[3]{x-7} - 2$



x-int: let $y = 0$

$0 = -\sqrt[3]{x-7} - 2$

$2 = -\sqrt[3]{x-7}$

$-2 = \sqrt[3]{x-7}$

$-8 = x - 7$

$x = -1$

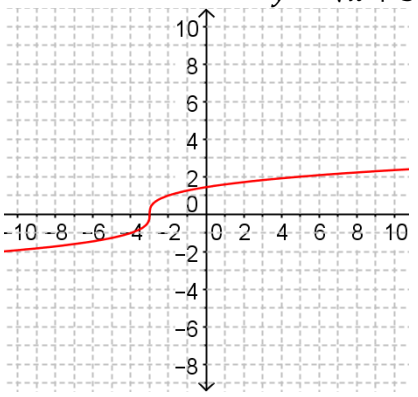
y-int: let $x = 0$

$y = -\sqrt[3]{0-7} - 2$

$y = \sqrt[3]{7} - 2$

Domain:	$\mathbb{R}$
Range:	$\mathbb{R}$
Max/Min:	$\emptyset$
x-intercept(s):	$(-1, 0)$
y-intercept:	$\left(0, \sqrt[3]{7} - 2\right)$
Increasing:	$\emptyset$
Decreasing:	$\mathbb{R}$
Positive:	$(-\infty, -1)$
Negative:	$(-1, \infty)$

6) $y = \sqrt[3]{x+3}$



y-int: let $x = 0$

$y = \sqrt[3]{0+3}$

$y = \sqrt[3]{3}$

Domain:	$\mathbb{R}$
Range:	$\mathbb{R}$
Max/Min:	$\emptyset$
x-intercept(s):	$(-3, 0)$
y-intercept:	$\left(0, \sqrt[3]{3}\right)$
Increasing:	$\mathbb{R}$
Decreasing:	$\emptyset$
Positive:	$(-3, \infty)$
Negative:	$(-\infty, -3)$

Answer each question thoroughly. Show all work.

7) Find the average rate of change over the given interval.

$y = -\sqrt{x} - 3;\ [4, 25]$

$y(25) = -\sqrt{25} - 3 = -8$

$y(4) = -\sqrt{4} - 3 = -5$

$m = \frac{-8 - -5}{25 - 4} = -\frac{3}{21} = -\frac{1}{7}$

8) Find the average rate of change over the given interval.

$y = \sqrt[3]{x-5};\ [6, 32]$

$y(32) = \sqrt[3]{32-5} = 3$

$y(6) = \sqrt[3]{6-5} = 1$

$m = \frac{3-1}{32-6} = \frac{2}{26} = \frac{1}{13}$