

Section 4.1 – Practice Problems

1. Answer the following questions to lockdown your vocabulary.

a) In radical notation, $\sqrt[n]{x}$, x is called what? <p style="text-align: center;"><u>Radicand</u></p>	b) In radical notation, what do we call the root symbol? <p style="text-align: center;"><u>Radical</u></p>
c) In radical notation, $\sqrt[n]{x}$, n is called what? <p style="text-align: center;"><u>Root</u></p>	d) The n^{th} root of x is written? <p style="text-align: center;"><u>$\sqrt[n]{x}$</u></p>
e) $\sqrt{25} = 5$ is read the <u>square</u> root of 25 equals 5.	f) $\sqrt[3]{-27} = -3$ is read the <u>cube</u> root of -27 equals -3 .
g) The n^{th} root of x is not a real number if n is <u>even</u> and x is <u>negative</u>	h) The Domain of a radical with even index excludes all values that make the radicand <u>Negative</u>

2. Solve for x .

a) $x^2 = 9$ <p style="text-align: center;"><u>$x = \pm 3$</u></p>	b) $x^2 = -9$ <p style="text-align: center;"><u>NO SOLUTION</u> \emptyset</p>	c) $x^3 = 8$ <p style="text-align: center;"><u>$x = 2$</u></p>	d) $x^3 = -8$ <p style="text-align: center;"><u>$x = -2$</u></p>
e) $x^4 = 1$ <p style="text-align: center;"><u>$x = \pm 1$</u></p>	f) $x^4 = -1$ <p style="text-align: center;"><u>NO SOLUTION</u> \emptyset</p>	g) $x^5 = 32$ <p style="text-align: center;"><u>$x = 2$</u></p>	h) $x^5 = -32$ <p style="text-align: center;"><u>$x = -2$</u></p>

3. Simplify each radical

a) $\sqrt{4x^2}$, $x \geq 0$ <p style="text-align: center;"><u>$2x$</u></p>	b) $\sqrt{4x^2}$, $x < 0$ <p style="text-align: center;"><u>$2x$ but $x < 0$ so $-2x$</u></p>
c) $\sqrt[3]{27x^3}$, $x < 0$ <p style="text-align: center;"><u>$-3x$</u></p>	d) $\sqrt[3]{-27x^3}$, $x \geq 0$ <p style="text-align: center;"><u>$-3x$</u></p>

4. What is the Domain and Range of the following functions?

a) $y = x$

D: All Real Numbers

R: All Real Numbers

b) $y = \sqrt{x}$

D: $x \geq 0$

R: $y \geq 0$

c) $y = \sqrt{1-x}$

D: $1-x \geq 0$

$1 \geq x$

D: $x \leq 1$

R: $y \geq 0$

d) $y = -\sqrt{x-1}$

D: $x-1 \geq 0$

D: $x \geq 1$

R: $y \leq 0$

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

D: $x \leq 1$

$1-x \geq 0$

$1 \geq x$

$y \geq -2$

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

D: $x \geq 1$

R: $y \geq 2$

g) $y + 3 = \sqrt{2x - 4}$

D: $2x - 4 \geq 0$

$2x \geq 4$

$x \geq 2$

D: $x \geq 2$

R: $y \geq -3$

h) $y - 3 = -\sqrt{2x + 4}$

D: $2x + 4 \geq 0$

$2x \geq -4$

$x \geq -2$

D: $x \geq -2$

R: $y \leq 3$

i) $y = -\sqrt{-2x - 4} + 3$

$-2x - 4 \geq 0$

$-2x \geq 4$ $x \leq -2$

D: $x \leq -2$

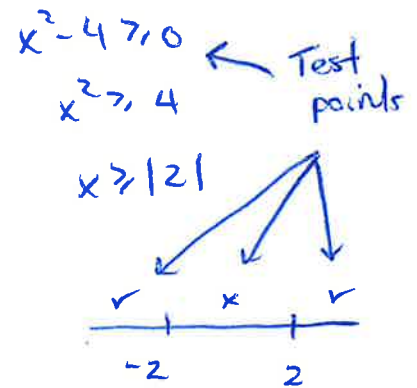
R: $y \leq 3$

j) $y = \sqrt{x^2 - 4}$

D: $x \leq -2$

$x \geq 2$

R: $y \geq 0$



k) $y = -\sqrt{4 - x^2}$

$-x^2 + 4 \geq 0$

$x^2 - 4 \leq 0$

$x^2 \leq 4$

$x \leq |2|$

D: $-2 \leq x \leq 2$

R: $y \leq 0$



l) $y = -\sqrt{x^3 - 8}$

$x^3 - 8 \geq 0$

$x^3 \geq 8$

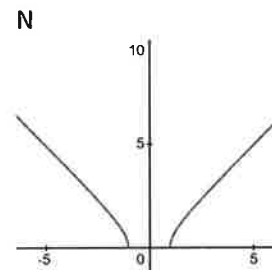
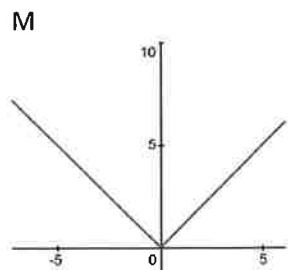
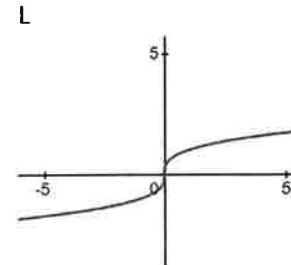
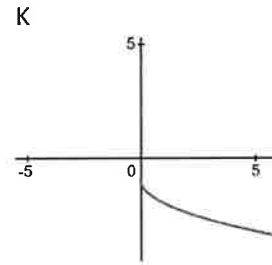
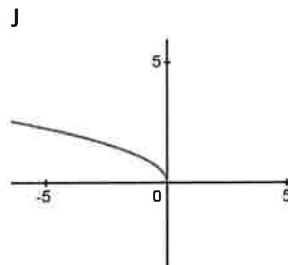
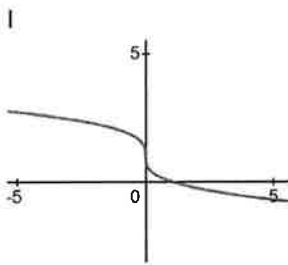
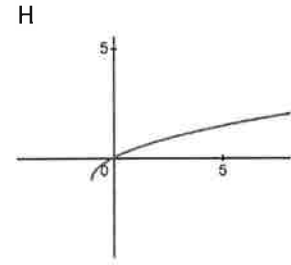
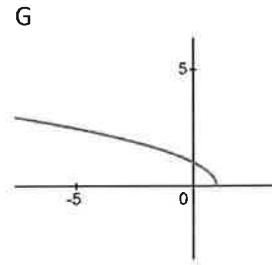
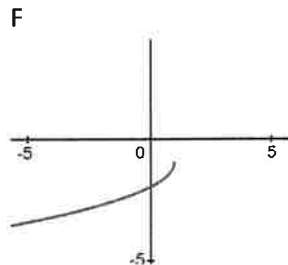
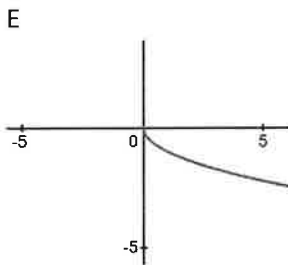
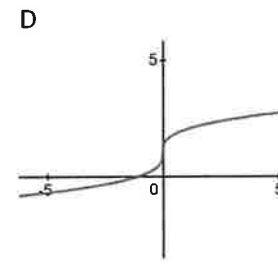
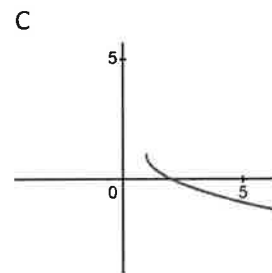
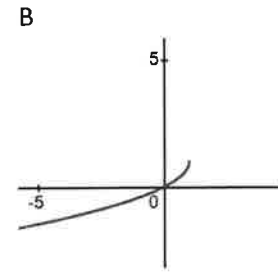
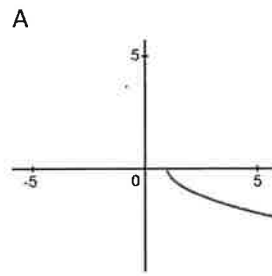
$x \geq 2$

D: $x \geq 2$

R: $y \leq 0$

5. Match the equation with the graph.

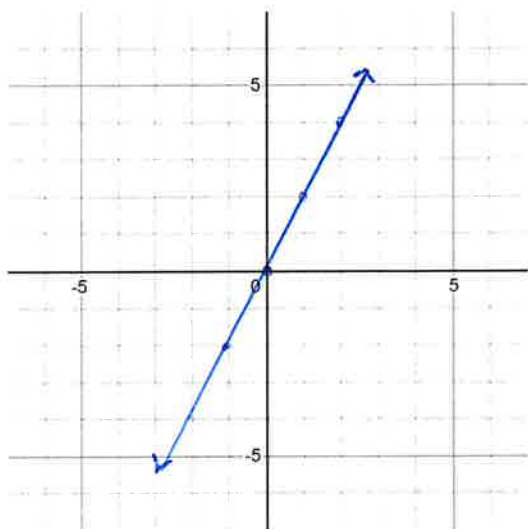
a) $f(x) = \sqrt{-x}$	J
b) $f(x) = -\sqrt{x}$	E
c) $f(x) = \sqrt[3]{x}$	L
d) $f(x) = \sqrt{1-x}$	G
e) $f(x) = \sqrt{x^2}$	M
f) $f(x) = -\sqrt{x-1}$	A
g) $f(x) = -\sqrt{x}-1$	K
h) $f(x) = 1 - \sqrt[3]{-x}$	D
i) $f(x) = 1 - \sqrt{x-1}$	C
j) $f(x) = 1 - \sqrt{1-x}$	B
k) $f(x) = \sqrt{x^2-1}$	N
l) $f(x) = 1 + \sqrt[3]{-x}$	H
m) $f(x) = -1 - \sqrt{1-x}$	F
n) $f(x) = -1 + \sqrt{x+1}$	I



6. Graph the following functions. State the Domain and the Range

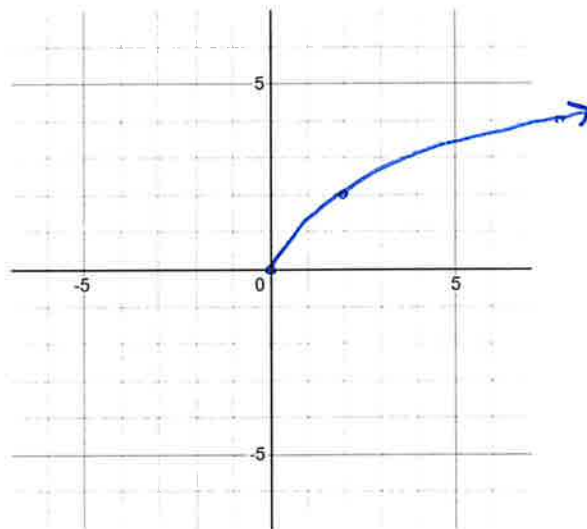
a) $f(x) = 2x$

Domain: All Real #s
Range: All Real #s



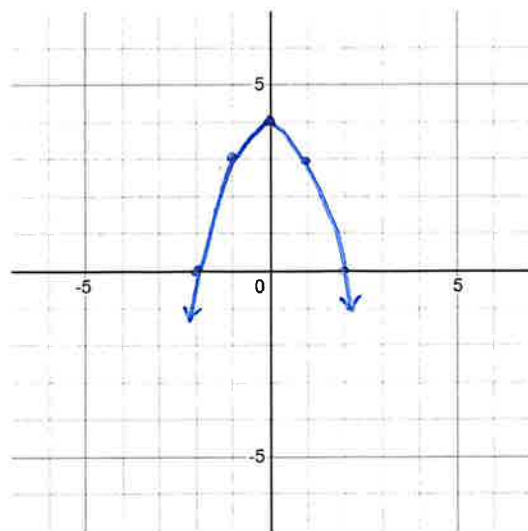
b) $f(x) = \sqrt{2x}$

Domain: $x \geq 0$
Range: $y \geq 0$



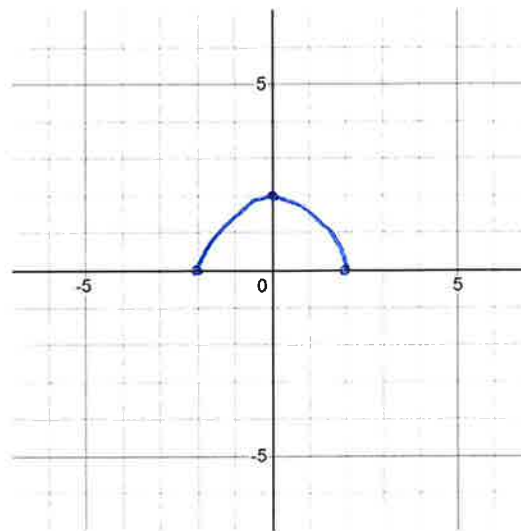
c) $f(x) = 4 - x^2$

Domain: All Real #s
Range: $y \leq 4$



d) $f(x) = \sqrt{4 - x^2}$

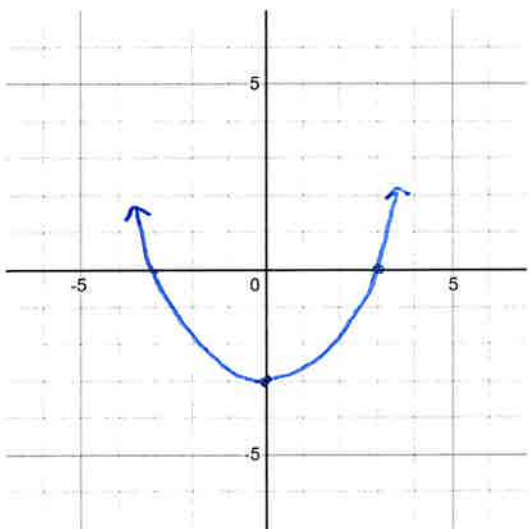
Domain: $-2 \leq x \leq 2$
Range: $0 \leq y \leq 2$



$4 - x^2 \geq 0$
 $4 \geq x^2$
 $|x| \leq 2$

e) $f(x) = \frac{1}{3}x^2 - 3$

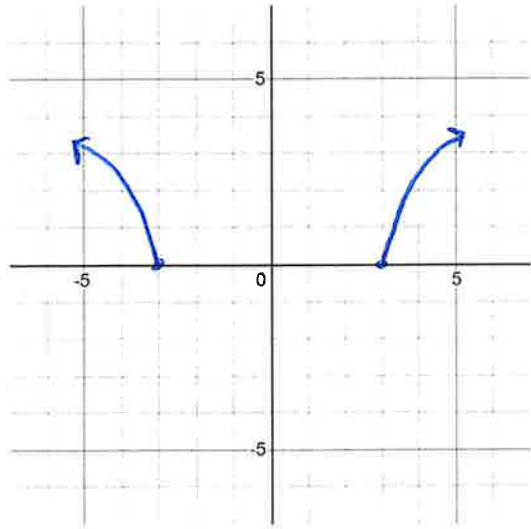
Domain: All Real #s
Range: $y \geq -3$



f) $f(x) = \sqrt{\frac{1}{3}x^2 - 3}$

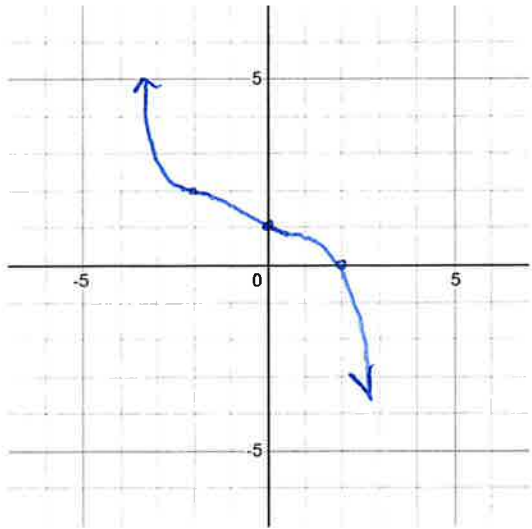
Domain: $x \leq -3$ or $x \geq 3$
Range: $y \geq 0$

$\frac{1}{3}x^2 - 3 \geq 0$
 $\frac{1}{3}x^2 \geq 3$ $x^2 \geq 9$
 $x \geq |3|$



g) $f(x) = -\frac{1}{8}x^3 + 1$

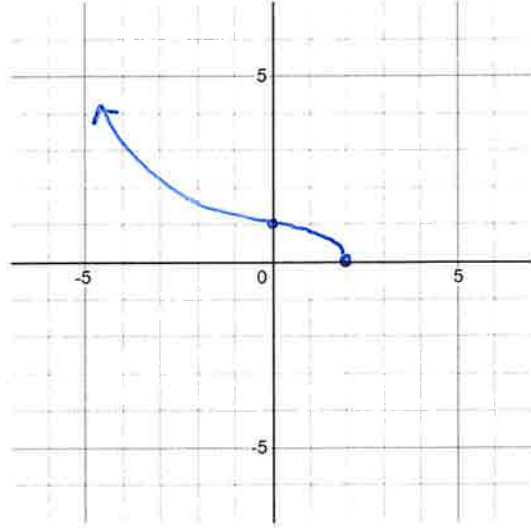
Domain: All Real #s
Range: All Real #s



h) $f(x) = \sqrt{-\frac{1}{8}x^3 + 1}$

Domain: $x \leq 2$
Range: $y \geq 0$

$-\frac{1}{8}x^3 + 1 \geq 0$
 $x^3 \leq 8$
 $x \leq 2$



See Website for Detailed Answer Key of the Remainder of the Questions

Pre-Calculus 12

Extra Work Space