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HW M12P Section 2.1 Graphing Radical Functions:

1. How do you tell whether if a radical function opens to the left or the right?

$y = A\sqrt{B(x-C)} + D$ If B is negative -> open left $y = \sqrt{x}$

If B is positive -> open right $y = \sqrt{-x}$

2. Given the radical function $y = \frac{1}{A}\sqrt{(B(x-C))} + D$, where "A,B,C, and D" are all positive, what the domain and range of this function?

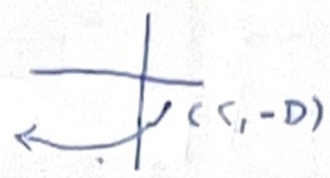


D: $x \geq C$

R: $y \geq D$

3. Using the same formula from above, if $A < 0, B < 0, C > 0$ *and* $D < 0$, what is the domain of the function?

opens down, left



D: $x \leq C$

R: $y \leq D$

4. What are the steps in graphing a radical function? Explain:

1 determine if graph opens up/down, left right

2 find centre point

3 graph with nice points

5. Indicate which way the radical functions open: UP/DOWN/LEFT/RIGHT? Then state the domain and range:

a) $y = 4 + \sqrt{3x+2}$ opens up, right → D: $x \geq -\frac{2}{3}$ R: $y \geq 4$ $3x+2=0$ $x = -\frac{2}{3}$ $y = 4$ $(-\frac{2}{3}, 4)$	b) $y = -3 - \sqrt{5x-17}$ opens right, down ↘ D: $x \geq \frac{17}{5}$ R: $y \leq -3$ $5x-17=0$ $x = \frac{17}{5}$ $y = -3$ $(\frac{17}{5}, -3)$
c) $4 - y = \sqrt{6-4x}$ $-y = \sqrt{6-4x} - 4$ $y = -\sqrt{-4x+6} + 4$ opens down, left ← D: $x \leq \frac{3}{2}$ R: $y \leq 4$ $6-4x=0$ $x = \frac{3}{2}$ $(\frac{3}{2}, 4)$	d) $8 + 2y = 7 - \sqrt{-7x-2}$ $2y = -\sqrt{-7x-2} - 1$ $y = -\frac{1}{2}\sqrt{-7x-2} - \frac{1}{2}$ opens down, left ← D: $x \leq -\frac{2}{7}$ R: $y \leq -\frac{1}{2}$ $-7x-2=0$ $x = -\frac{2}{7}$ $y = -\frac{1}{2}$ $(-\frac{2}{7}, -\frac{1}{2})$
e) $y = -\frac{2}{3}(7 - \sqrt{-6-x})$ $y = -\frac{14}{3} + \frac{2}{3}\sqrt{-6-x}$ opens left, up ← D: $x \leq -6$ R: $y \geq -\frac{14}{3}$ $-6-x=0$ $x = -6$ $y = -\frac{14}{3}$	f) $7y + \sqrt{-(2+x)} + 9 = 0$ $7y = -\sqrt{-x-2} - 9$ $y = -\frac{1}{7}\sqrt{-x-2} - \frac{9}{7}$ opens left, down ↙ D: $x \leq -2$ R: $y \leq -\frac{9}{7}$ $-x-2=0$ $x = -2$ $y = -\frac{9}{7}$ $(-2, -\frac{9}{7})$

6. Graph the following radical functions. State the domain and range:

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

opens up, right

$2x+3=0$

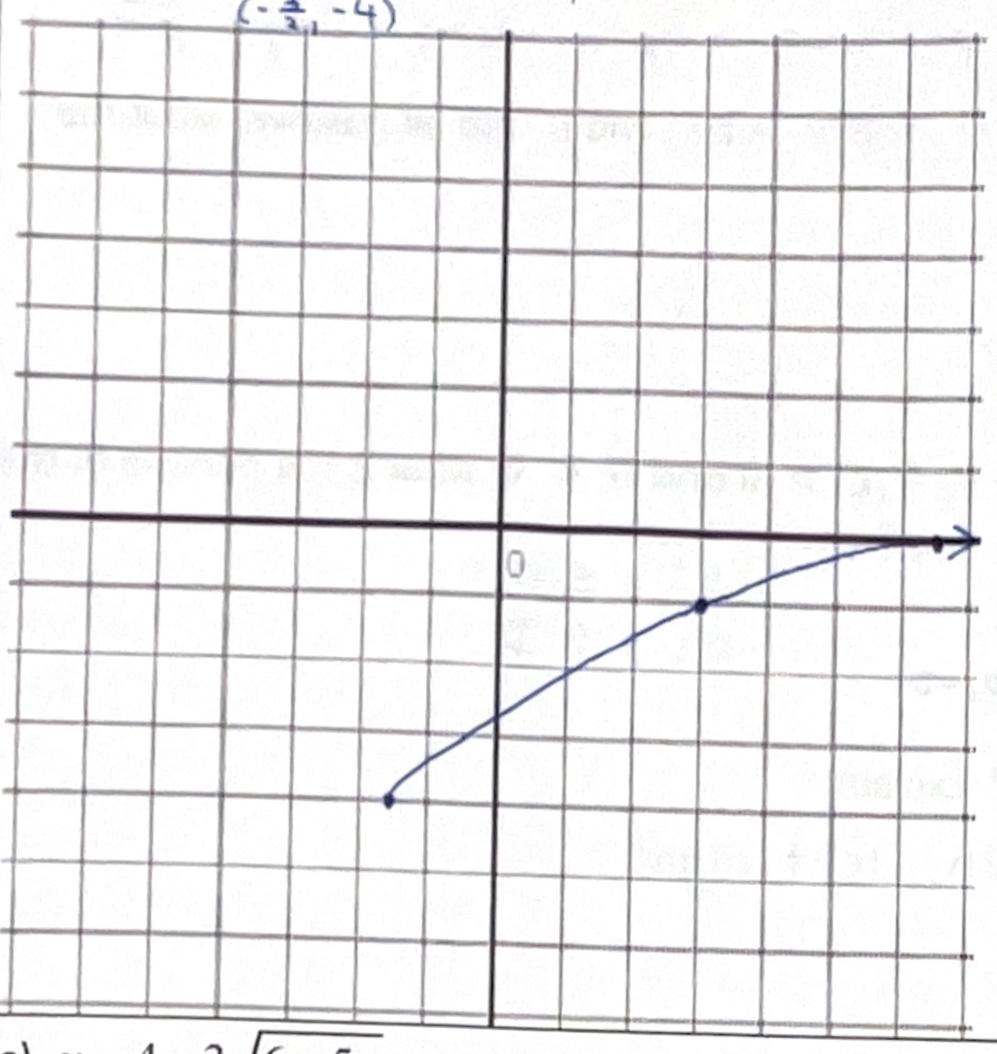
$x=-\frac{3}{2}$

$y=-4$

$(-\frac{3}{2},-4)$

D: $x \geq -\frac{3}{2}$

R: $y \geq -4$



b) $y=4-\sqrt{5-2x}$

opens left, down

$5-2x=0$

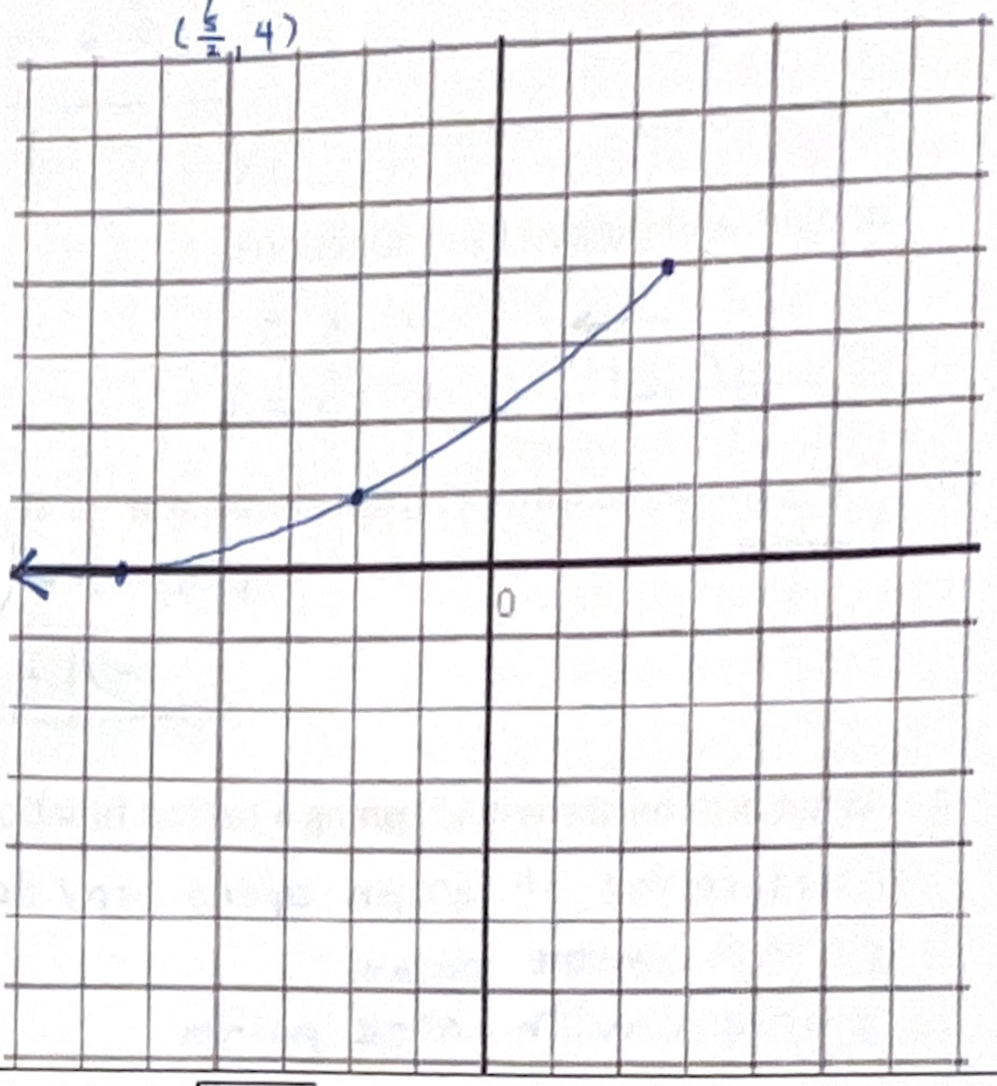
$x=\frac{5}{2}$

$y=4$

$(\frac{5}{2},4)$

D: $x \leq \frac{5}{2}$

R: $y \leq 4$



c) $y=4-3\sqrt{6-5x}$

opens left, down

$6-5x=0$

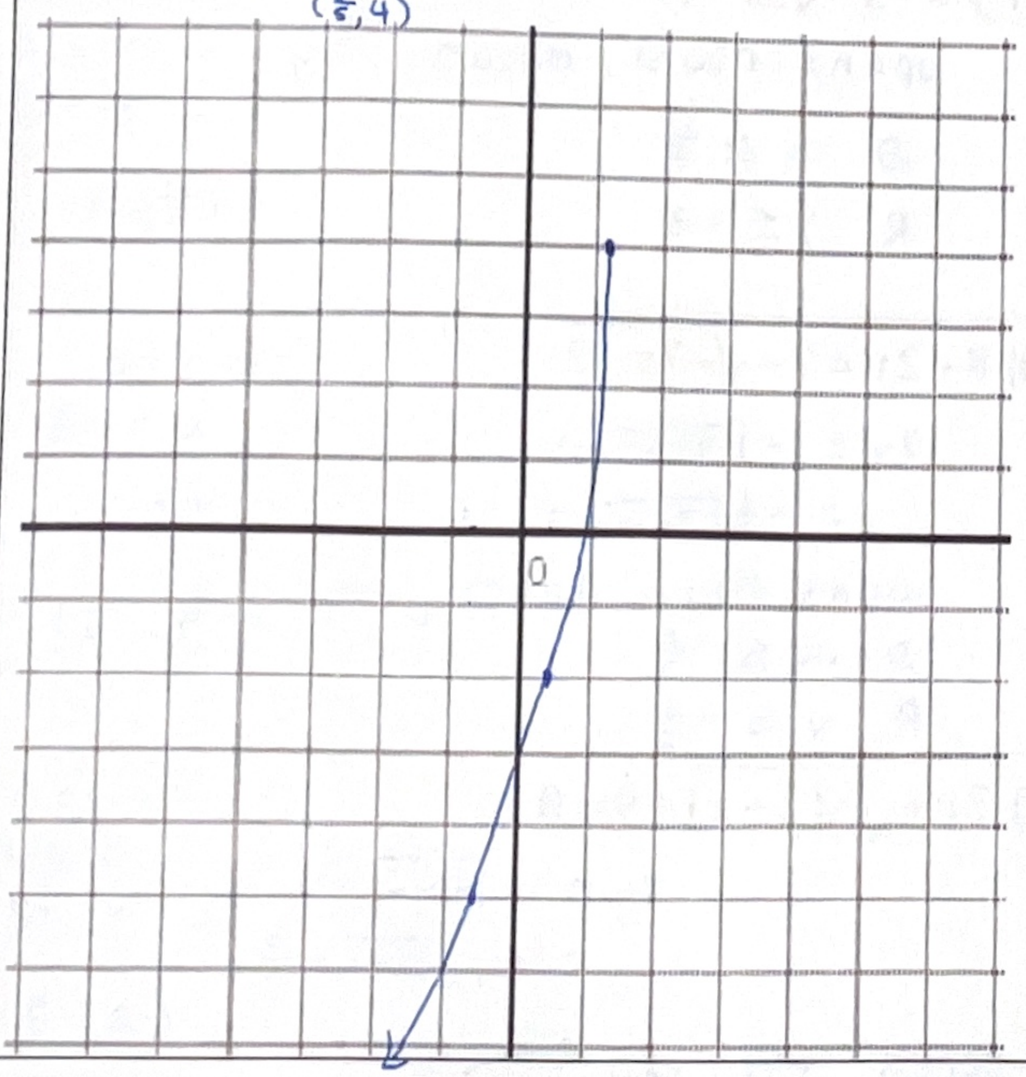
$x=\frac{6}{5}$

$y=4$

$(\frac{6}{5},4)$

D: $x \leq \frac{6}{5}$

R: $y \leq 4$



d) $y=2\sqrt{8+3x}-5$

opens right, down

$8+3x=0$

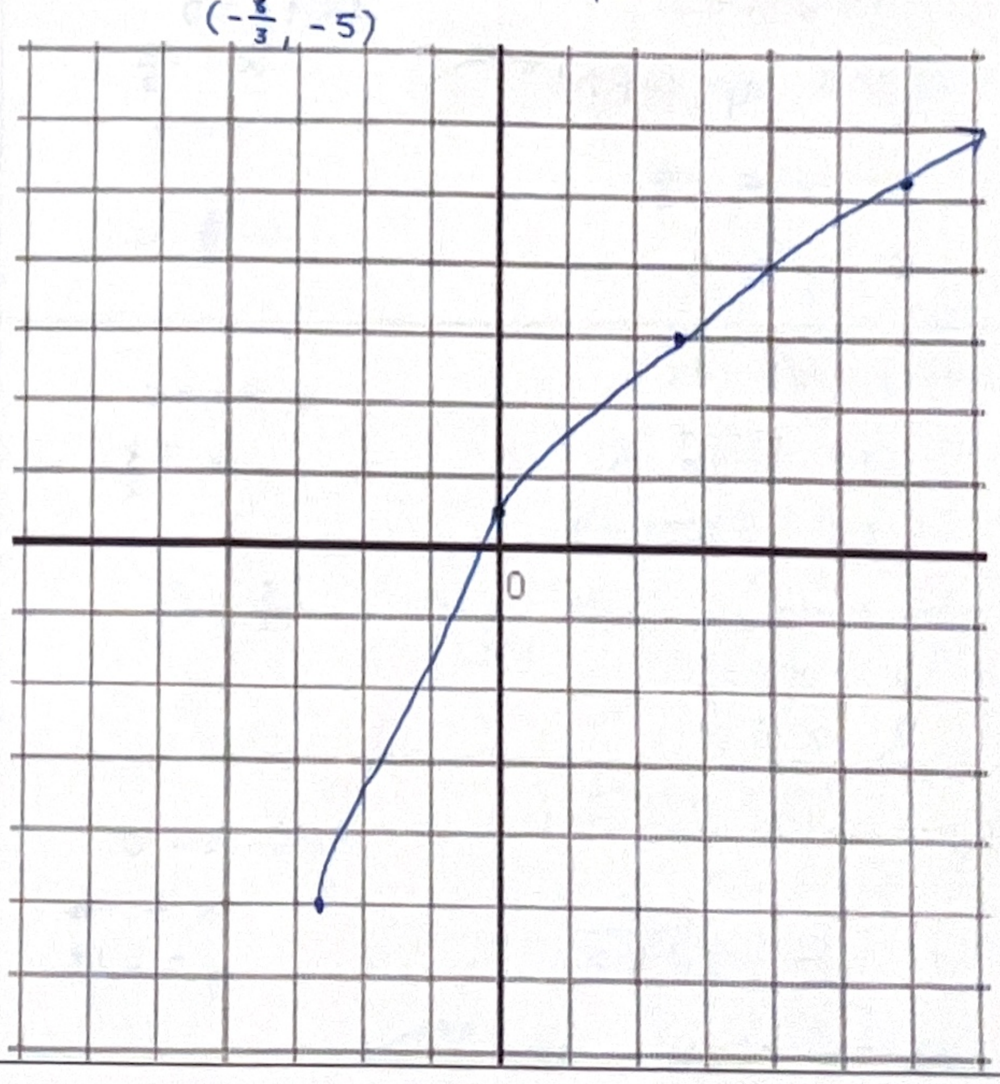
$x=-\frac{8}{3}$

$y=-5$

$(-\frac{8}{3},-5)$

D: $x \geq -\frac{8}{3}$

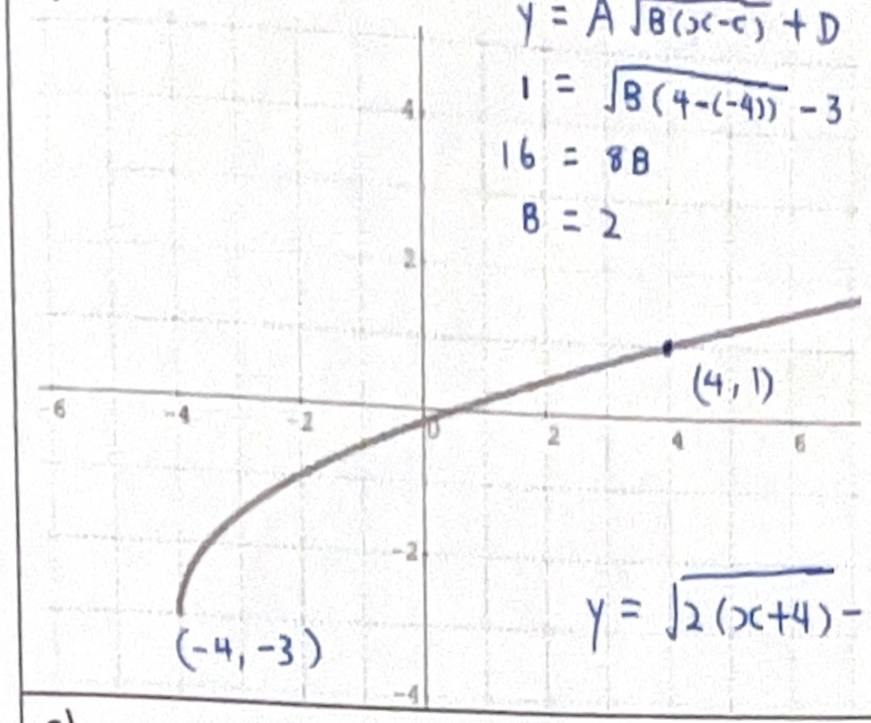
R: $y \geq -5$



A and B affect each other
make A or B=1

7. Find the equation of the radical functions: C, D = vertex
x, y = any point

a)

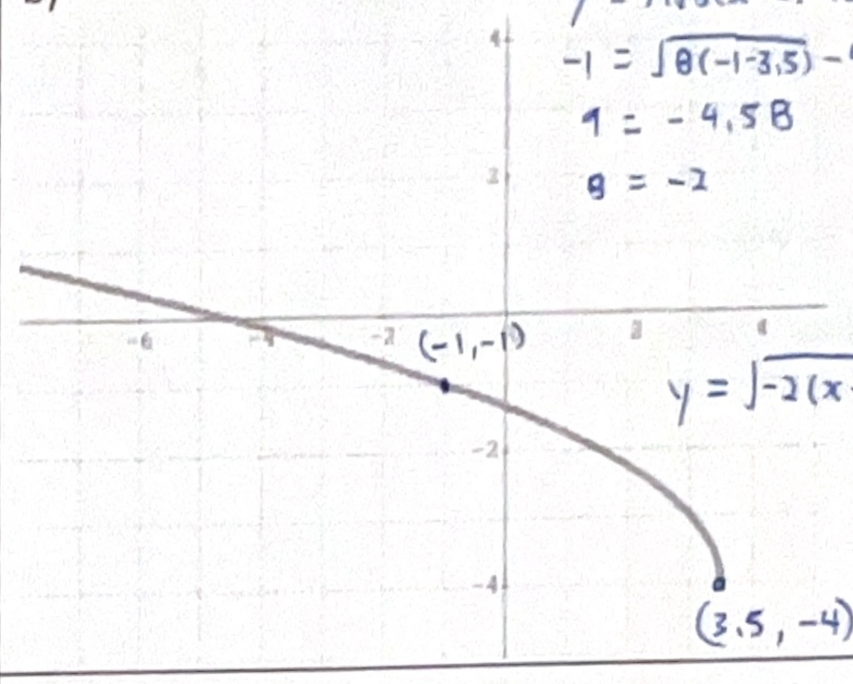


$y = A\sqrt{B(x-c)} + D$
$1 = \sqrt{B(4-(-4))} - 3$
$16 = 8B$
$B = 2$

$c = -4$
$D = -3$
$A = 1$
$x = 4$
$y = 1$

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

b)



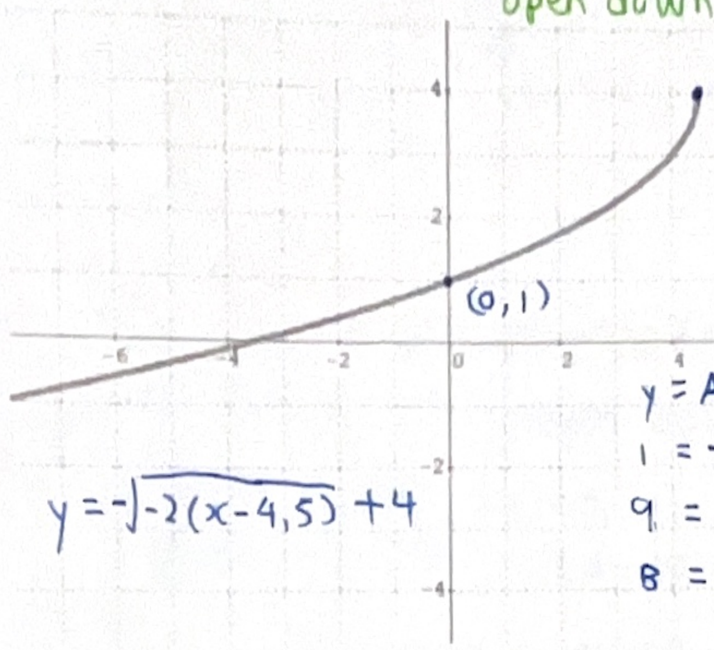
$y = A\sqrt{B(x-c)} + D$
$-1 = \sqrt{B(-1-3.5)} - 4$
$1 = -4.5B$
$B = -2$

$c = 3.5$
$D = -4$
$A = 1$
$x = -1$
$y = -1$

$y = \sqrt{-2(x-3.5)} - 4$

c)

open down A -> negative

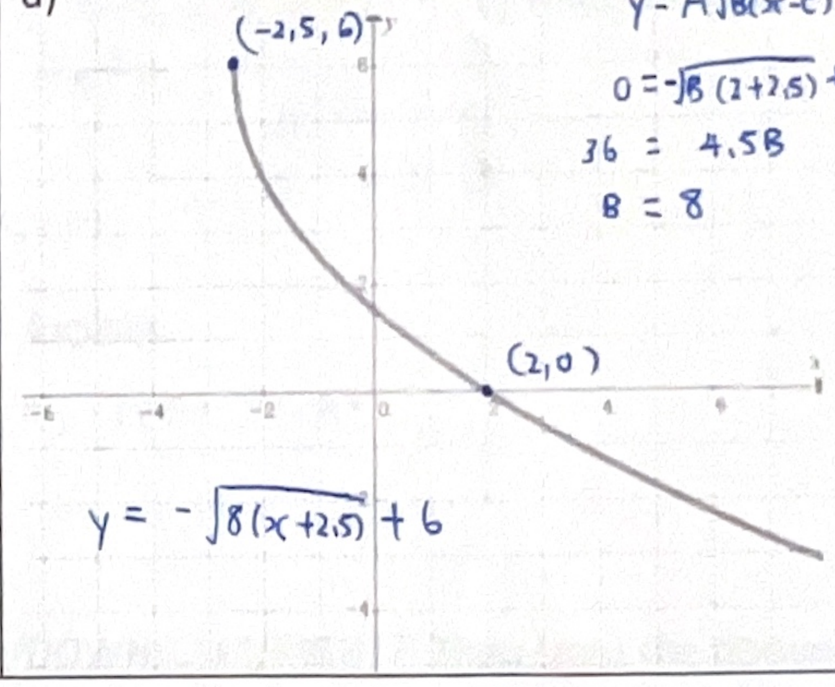


$y = A\sqrt{B(x-c)} + D$
$1 = -\sqrt{B(0-4.5)} + 4$
$9 = -4.5B$
$B = -2$

$c = 4.5$
$D = 4$
$A = -1$
$y = 1$
$x = 0$

$y = -\sqrt{-2(x-4.5)} + 4$

d)



$y = A\sqrt{B(x-c)} + D$
$0 = -\sqrt{B(2+2.5)} + 6$
$36 = 4.5B$
$B = 8$

$y = 0$
$x = 2$
$A = -1$
$c = -2.5$
$D = 6$

$y = -\sqrt{8(x+2.5)} + 6$

8. Given the following radical functions, complete the table of values given. Give your answers accurate to atleast 2 decimal places:

a) $y = 3\sqrt{4+3x} - 10$

x	y
4	2
20	14
$430\frac{2}{3}$	98

$98 = 3\sqrt{4+3x} - 10$
$\frac{108}{3} = \sqrt{4+3x}$
$1292 = 3x$
$x = \frac{1292}{3}$

b) $y = \frac{2}{3}\sqrt{4+6x} + 12$

x	y
0	$13\frac{1}{3}$
2	$14\frac{2}{3}$
$\frac{65}{24}$	15

$15 = \frac{2}{3}\sqrt{4+6x} + 12$
$\frac{9}{2} = \sqrt{4+6x}$
$\frac{65}{4} = 6x$
$x = \frac{65}{24}$

c) $y = -2\sqrt{5-3x} + 15$

x	y
3	NA
-5	6.056
$-0.41\overline{6}$	20

$20 = -2\sqrt{5-3x} + 15$
$-2.5 = \sqrt{5-3x}$
$1.25 = -3x$
$x = -0.41\overline{6}$

d) $y = \frac{1}{9}\sqrt{2(x-4)} + 11$

x	y
5	11.157
22	$11\frac{2}{3}$
44.5	12

$12 = \frac{1}{9}\sqrt{2(x-4)} + 11$
$9 = \sqrt{2(x-4)}$
$40.5 = x - 4$
$x = 44.5$