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HW Pre Calculus 12 Section 2.2 Graphing the Square Root of a Function: $y=\sqrt{f(x)}$:

1. Given each of the following equations, indicate whether if there are any x-intercepts OR not. If there are, indicate how many and where they are:

a) $y=3x-8$

$8=3x$

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

1 x-int

b) $y=\frac{2}{3}x+\frac{11}{5}$

$-\frac{11}{5}=\frac{2}{3}x$

$x=-\frac{33}{10}$

1 x-int

c) $y=3x^2-8$

$8=3x^2$

$\sqrt{\frac{8}{3}}=\sqrt{x^2}$

$x=\pm\sqrt{\frac{8}{3}}$

2 x-int

d) $y=-2x^2-5$

$5=-2x^2$

$-2.5=x^2$

0 x-int

e) $y=-2(x+4)^2+18$

$9=(x+4)^2$

$\pm 3=x+4$

$x=\pm 3-4$ $x=-1,-7$

2 x-int

f) $y=0.5(x-4)^2-4.5$

$9=(x-4)^2$

$\pm 3=x-4$

$x=\pm 3+4$ $x=1,7$

2 x-int

g) $y=4x^2-5x-2$

$a=4$ $b=-5$ $c=-2$

$x=\frac{-b\pm\sqrt{b^2-4ac}}{2a}$

$=\frac{5\pm\sqrt{25-4\cdot4(-2)}}{8}$

$=\frac{5\pm\sqrt{57}}{8}$ //

2 x-int

h) $y=-3x^2+5x-9$

$a=-3$ $b=5$ $c=-9$

$x=\frac{-b\pm\sqrt{b^2-4ac}}{2a}$

$=\frac{-5\pm\sqrt{5^2-4(-3)(-9)}}{-6}$

$=\frac{-5\pm\sqrt{-83}}{-6}$

0 x-int

i) $y=7x^2-11x-2$

$a=7$ $b=-11$ $c=-2$

$x=\frac{11\pm\sqrt{121-4(7)(-2)}}{14}$

$=\frac{11\pm\sqrt{177}}{14}$

2 x-int

2. When we take the square root of a function, which coordinate changes and which one will stay the same? Explain:

$(a,b) \rightarrow (a,\sqrt{b})$

the x coordinate remains the same
the y coordinate is square rooted

3. Suppose the coordinate (a,b) is on the function $y=f(x)$, where "b < 0", what will this coordinate become in the function $y=\sqrt{f(x)}$? Explain:

The coordinate no longer exists because we can't square root a negative

4. Suppose the coordinate (a,1) is on the function $y=f(x)$, what will this coordinate become in the function $y=\sqrt{f(x)}$? Explain:

$(a,\sqrt{1}) \rightarrow (a,1)$

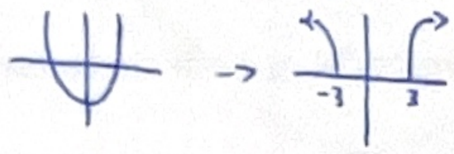
remains the same -> invariant point

5. When we perform the transformation from $y=f(x) \rightarrow y=\sqrt{f(x)}$, how are the "x" and "y" coordinated changed? Explain:

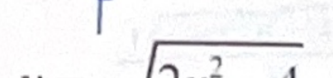
x-coordinate remains the same
y-coordinate is square rooted.

6. Match each equation with the corresponding graph:

i) $y = \sqrt{x^2 - 9}$ B

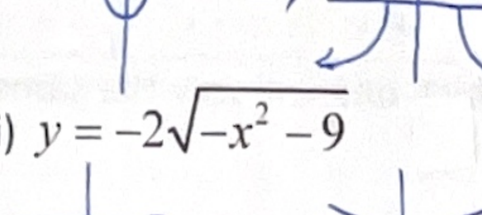


ii) $y = \sqrt{-x^2 + 9}$ A

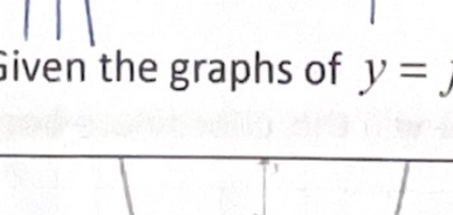


iii) $y = -\sqrt{-x^2 + 9}$ none

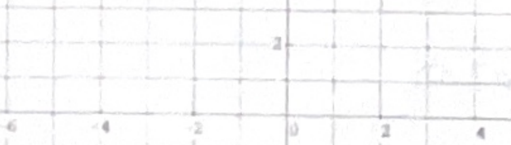
iv) $y = \sqrt{x^2 + 9}$ D



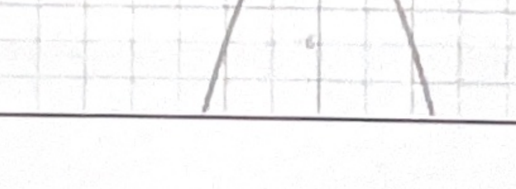
v) $y = \sqrt{2x^2 - 4}$



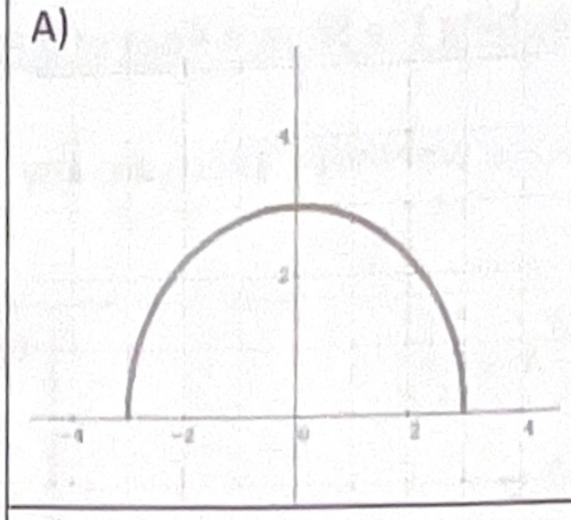
vi) $y = -\sqrt{2x^2 - 4}$ C



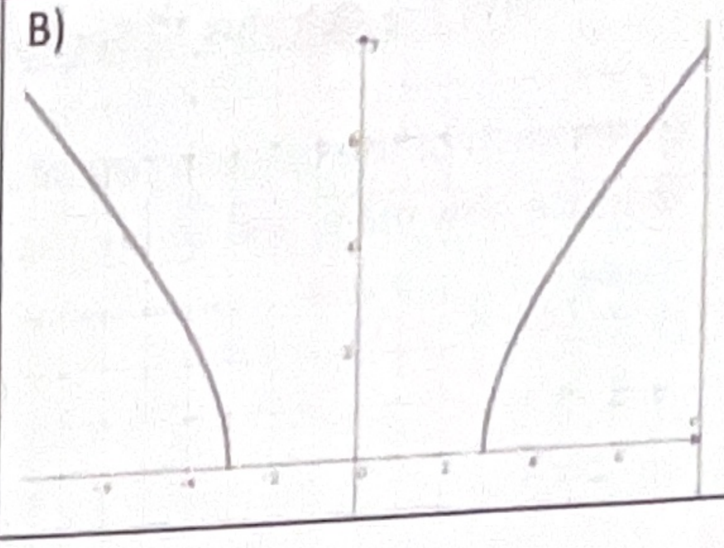
vii) $y = -2\sqrt{-x^2 - 9}$



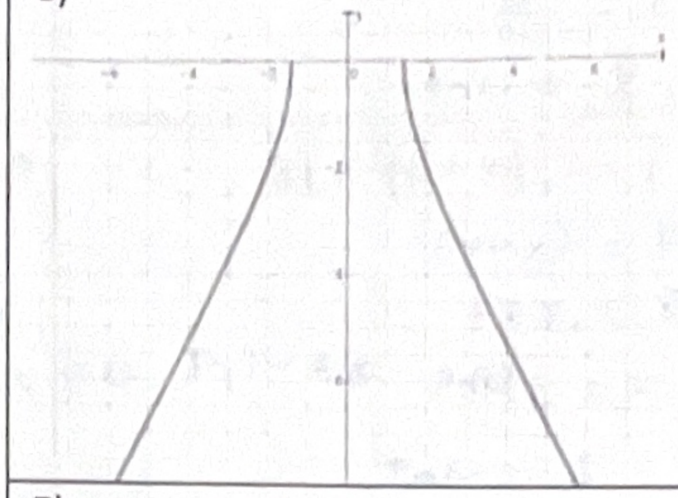
A)



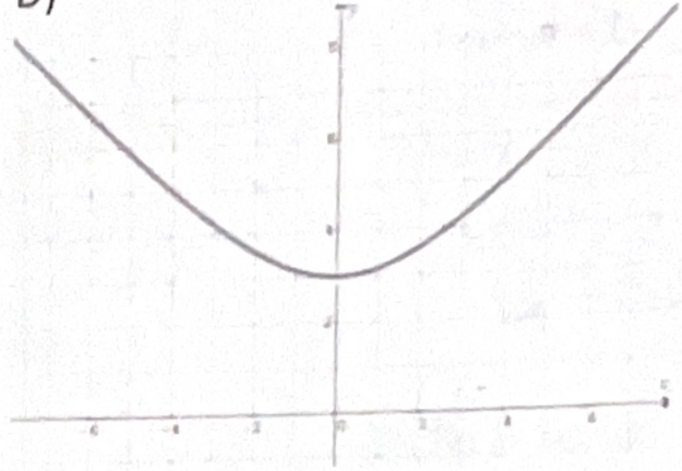
B)



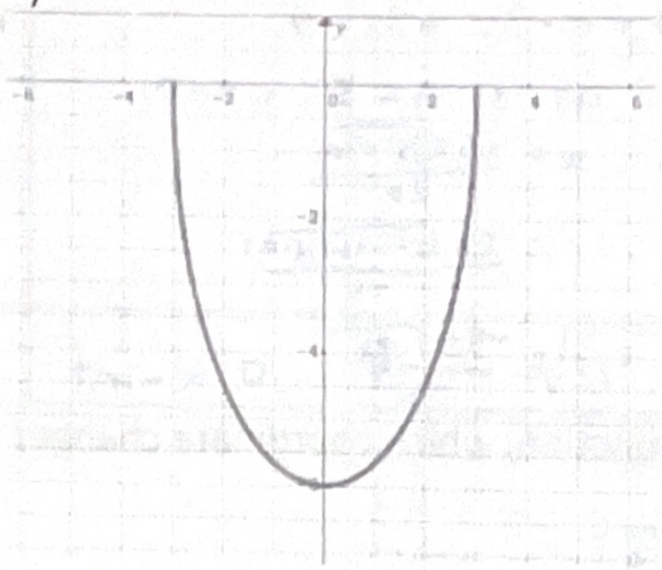
C)



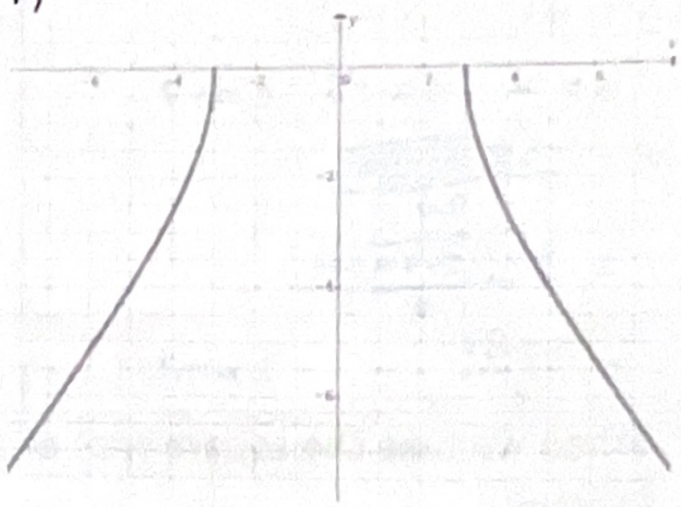
D)



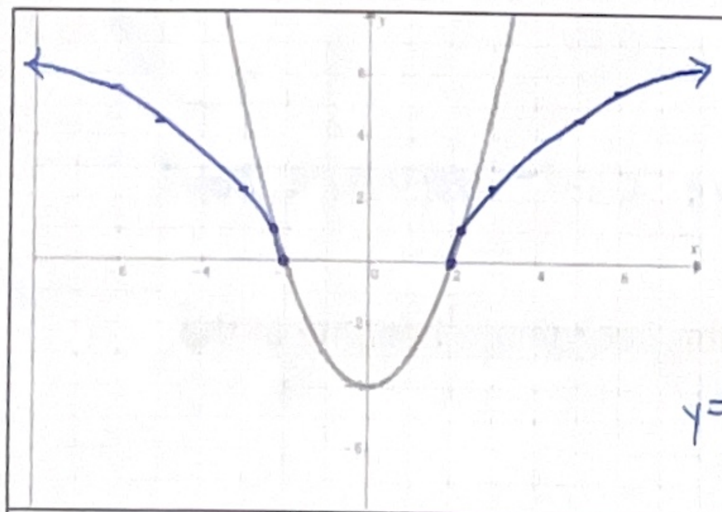
E)



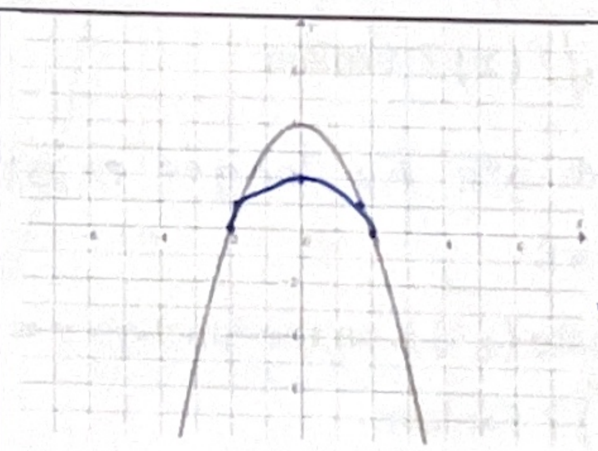
F)



7. Given the graphs of $y = f(x)$, draw the graphs of $y = \sqrt{f(x)}$



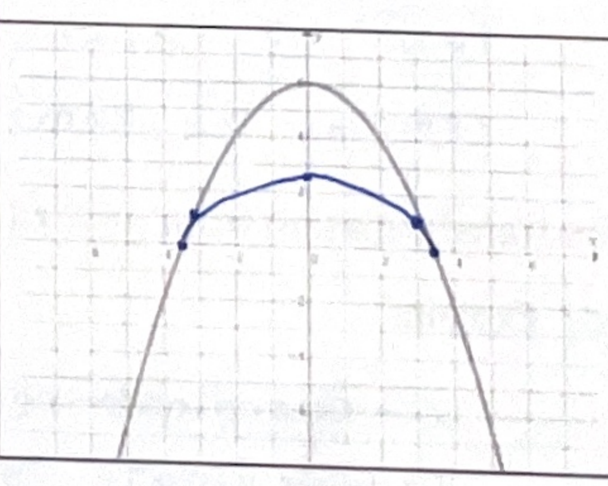
$y = \sqrt{x^2 - 4}$



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

: no graph

$y = \sqrt{-x^2 - 2}$



8. Graph the following and then determine the domain and range for each of the following functions. Show all your work and steps::

a) $y = \sqrt{x^2 - 6}$



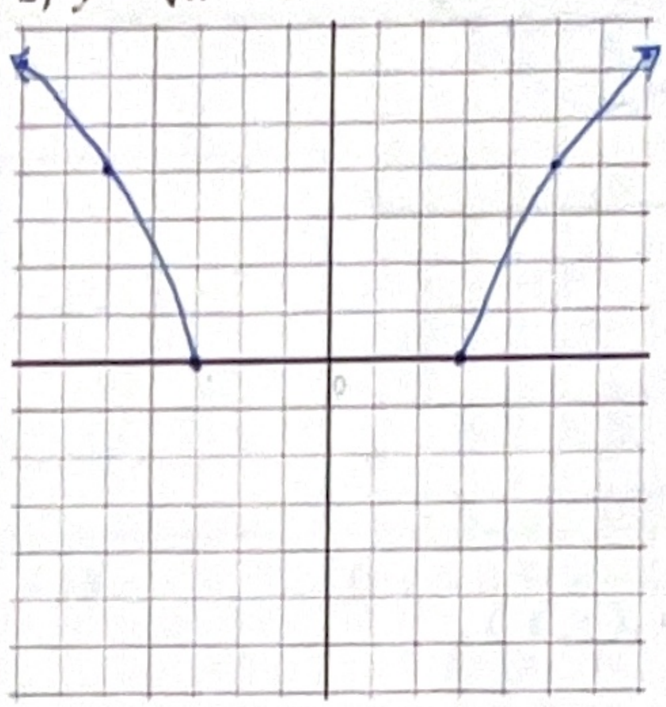
$x^2 - 6 = 0$

$x = \pm\sqrt{6}$

D: $x \geq \sqrt{6}$ $x \leq -\sqrt{6}$

R: $y \geq 0$

b) $y = \sqrt{x^2 - 9}$



$x^2 - 9 = 0$

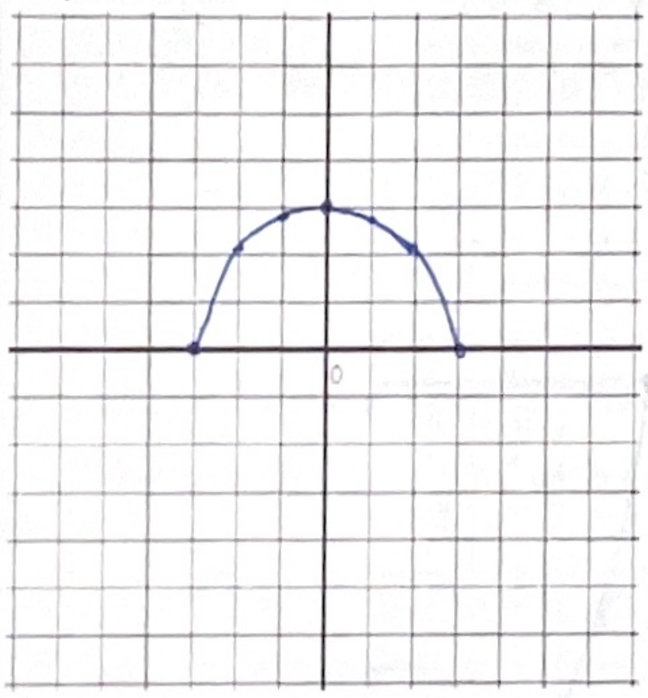
$x^2 = 9$

$x = \pm 3$

D: $x \geq 3$ $x \leq -3$

R: $y \geq 0$

c) $y = \sqrt{-x^2 + 9}$



$-x^2 + 9 = 0$

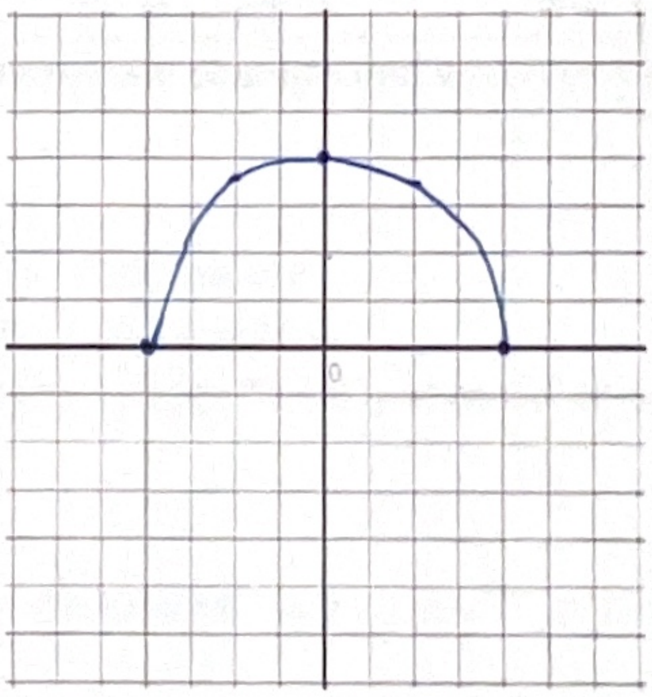
$-x^2 = -9$

$x = \pm 3$

D: $-3 \leq x \leq 3$

R: $0 \leq y \leq 3$

d) $y = \sqrt{-x^2 + 16}$



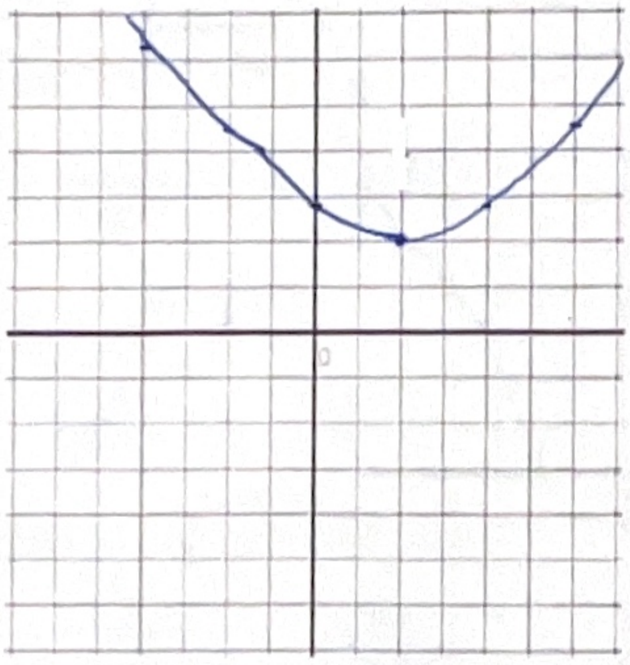
$-x^2 + 16 = 0$

$x = \pm 4$

D: $-4 \leq x \leq 4$

R: $0 \leq y \leq 4$

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



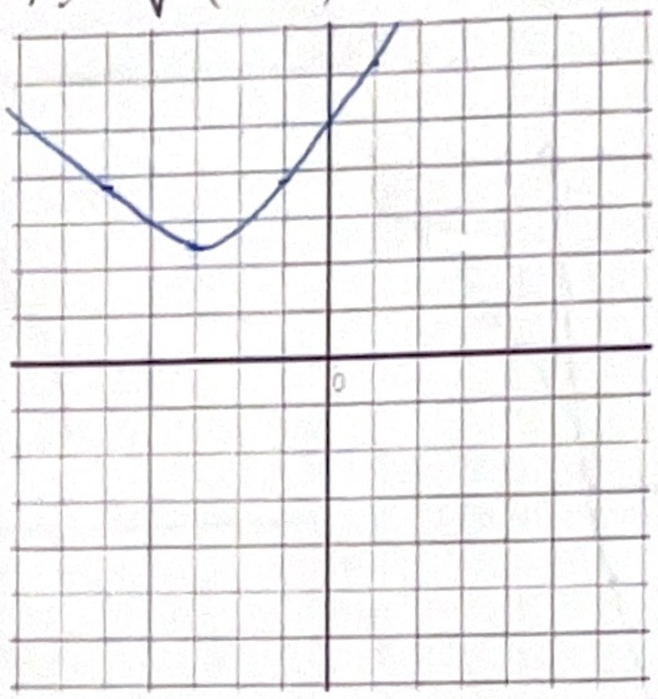
$(2,4) \rightarrow (2,2)$

no x-int

D: $x \in R$

R: $y \geq 2$

f) $y=\sqrt{2(x+3)^2+6}$



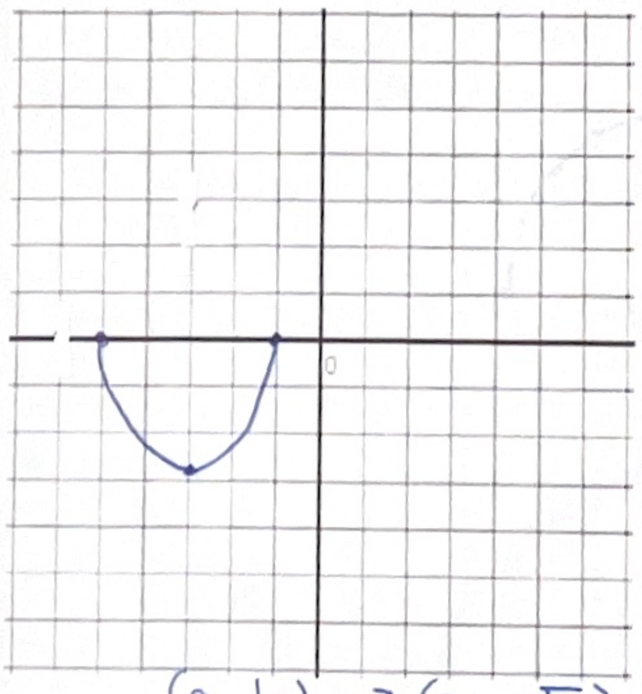
$(-3,6) \rightarrow (-3, 2,4)$

no x-int

D: $x \in R$

R: $y \geq \sqrt{6}$

g) $y=-\sqrt{-2(x+3)^2+8}$



$(a,b) \rightarrow (a,-\sqrt{b})$

$(-3,8) \rightarrow (-3,-2,8)$

D: $-5 \leq x \leq -1$

R: $-\sqrt{8} \leq y \leq 0$

$-2(x+3)^2+8=0$

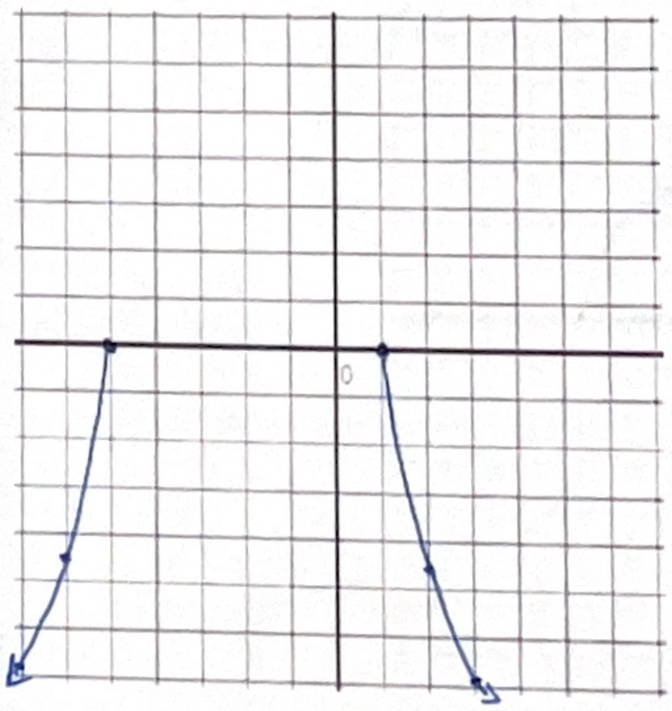
$(x+3)^2=4$

$x+3=\pm 2$

$x=\pm 2-3$

$x=-5,-1$

h) $y=-\sqrt{3x^2+12x-15}$



$y=-\sqrt{3(x^2+4x-5)}$

$=-\sqrt{3(x+5)(x-1)}$

$x=-5,1$