

Name: \_\_\_\_\_  
PC

Date: \_\_\_\_\_  
Ms. Loughran

Do Now:

1. Graph  $f(x) = x^2 - 4x + 7$ . Then find its:

- (a) vertex  $(2, 3)$
- (b) axis of symmetry  $x = 2$
- (c) domain  $(-\infty, \infty)$
- (d) range  $[3, \infty)$
- (e) x-intercepts no x-intercepts
- (f) y-intercept  $(0, 7)$

$$f(x) = x^2 - 4x + 4 - 4 + 7$$

$$f(x) = (x-2)^2 + 3$$

x-int (let  $y=0$ )

y-int (let  $x=0$ )

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

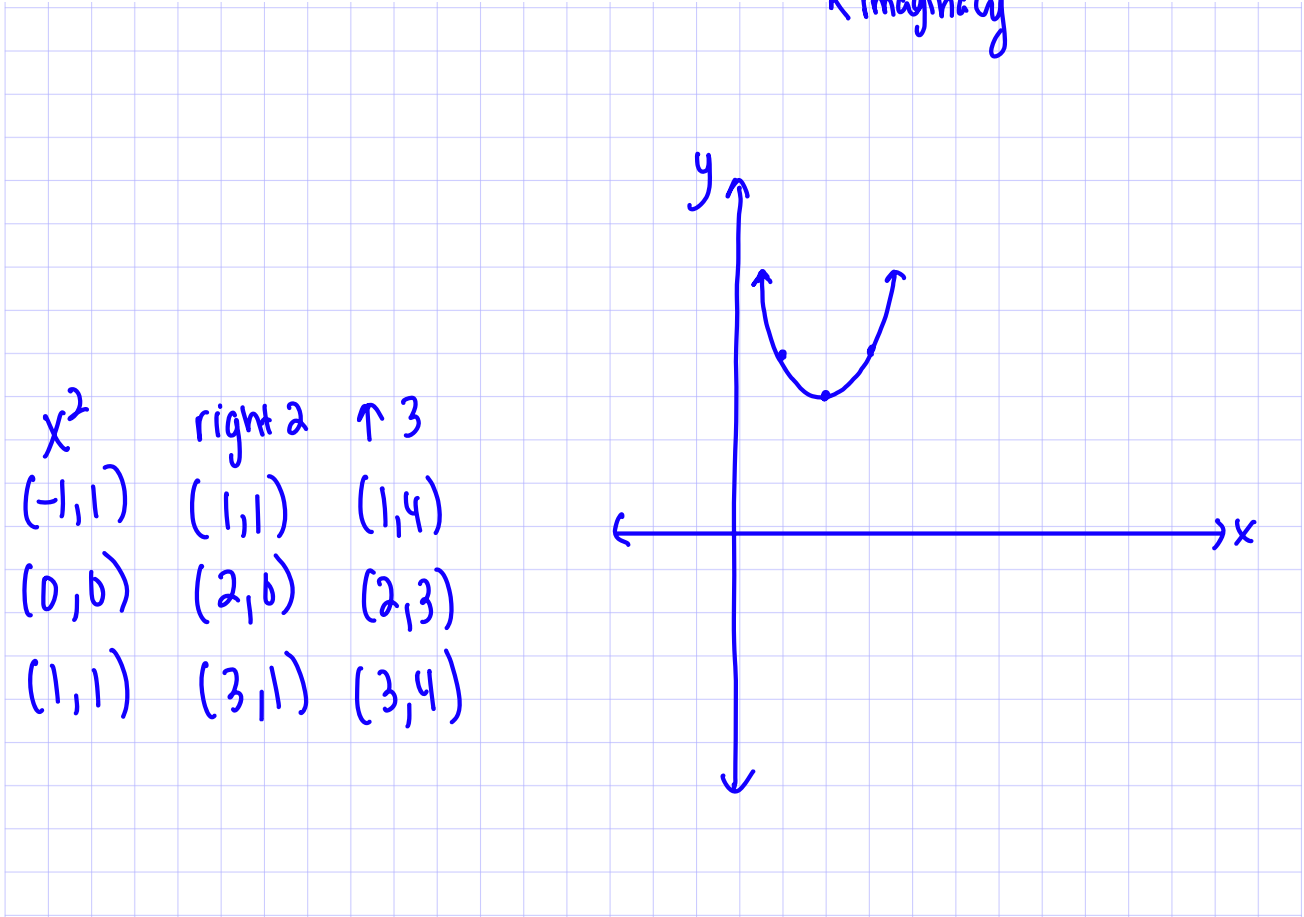
$$y = (0-2)^2 + 3$$

$$-3 = (x-2)^2$$

$$y = 7$$

$$\pm\sqrt{-3} = x-2$$

← imaginary



Name: \_\_\_\_\_  
PC: Writing Equations for Transformed Graphs

Date: \_\_\_\_\_  
Ms. Loughran

For 1 – 10, a function  $f$  is given, and the indicated transformations are applied to its graph (in the given order). Write the equation for the final transformed graph.

1.  $f(x) = x^2$ ; shift upward 3 units and shift 2 units to the right

$$y = (x-2)^2 + 3$$

2.  $f(x) = x^3$ ; shift downward 1 unit and shift 4 units to the left

$$y = (x+4)^3 - 1$$

3.  $f(x) = \sqrt{x}$ ; shift 3 units to the left, reflect over the  $x$ -axis, and shift upward 1 unit

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

4.  $f(x) = |x|$ ; shift to the right  $\frac{1}{2}$  and shift downward 2 units

$$y = |x - \frac{1}{2}| - 2$$

5.  $f(x) = x^4$ ; shift to the left 4 units, reflect over the  $x$ -axis and shift upward 10 units

$$y = -(x+4)^4 + 10$$

6.  $f(x) = \sqrt{x}$ ; reflected over the  $y$ -axis

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

7.  $f(x) = x^3$ ; shift left 1 unit, reflected over the  $x$ -axis and shift upward 2 units

$$y = -(x+1)^3 + 2$$

8.  $f(x) = x^2$ ; shift left 3 units and shift upward 5 units

$$y = (x+3)^2 + 5$$

9.  $f(x) = \sqrt{x}$ ; shift 4 units to the right and shift downward 3 units

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

10.  $f(x) = |x|$ ; shift 1 unit to the left, reflected over the  $x$ -axis and shift upward 5 units

$$y = -|x+1| + 5$$

Name: \_\_\_\_\_

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PC: Transformations of Parent Functions Review

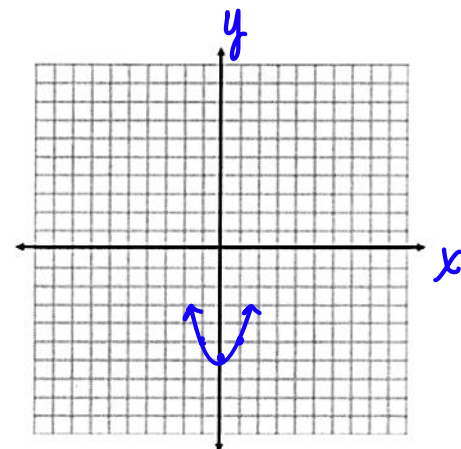
Ms. Loughran

For problem 1- 6, please give the name of the parent function and describe the transformation represented.

1.  $g(x) = x^2 - 6$

Parent:            $x^2$           

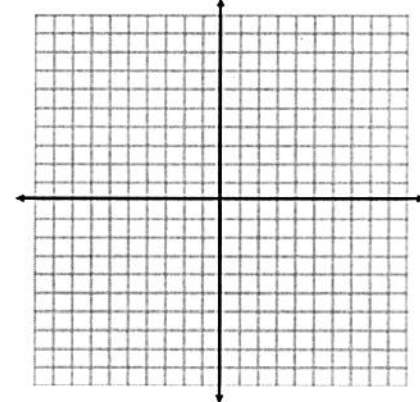
Transformations:            $\downarrow 6$           



2.  $f(x) = |x-1|$

Parent: \_\_\_\_\_

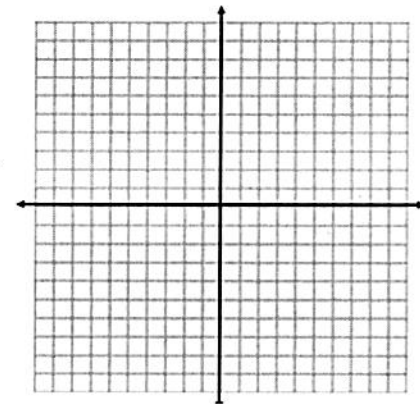
Transformations: \_\_\_\_\_



3.  $h(x) = \sqrt{x} + 4$

Parent: \_\_\_\_\_

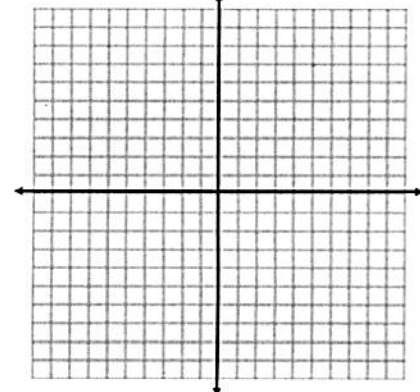
Transformations: \_\_\_\_\_



4.  $g(x) = (x+1)^2 + 3$

Parent: \_\_\_\_\_

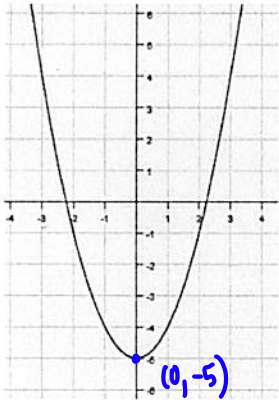
Transformations: \_\_\_\_\_



Write the equation for the following translations of their particular parent graphs. You may use  $y=$  or function notation (the  $f(x)$  type notation).

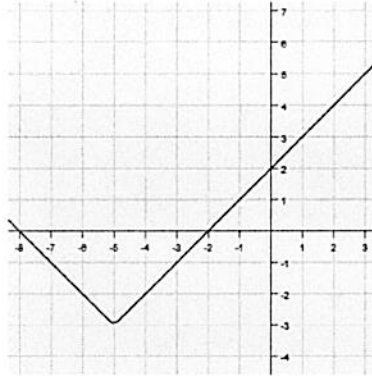
↑  
↓  
←

17.  $f(x) = x^2 - 5$

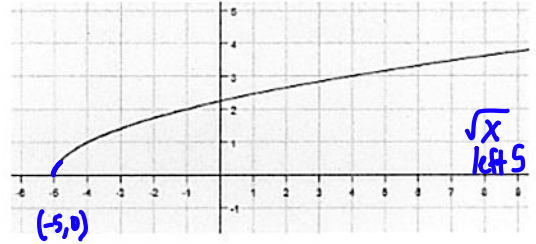


$x^2$  ↓ 5

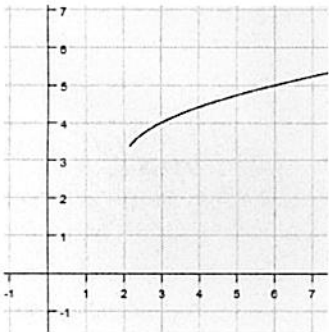
18. \_\_\_\_\_



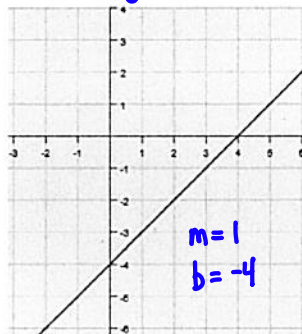
19.  $y = \sqrt{x+5}$



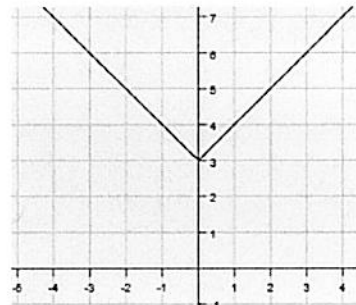
20. \_\_\_\_\_



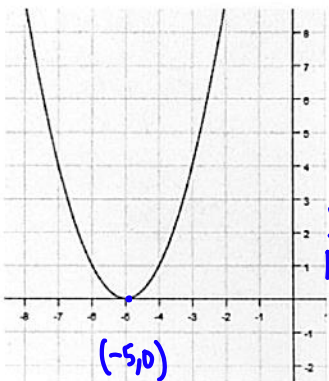
21.  $y = x - 4$



22. \_\_\_\_\_

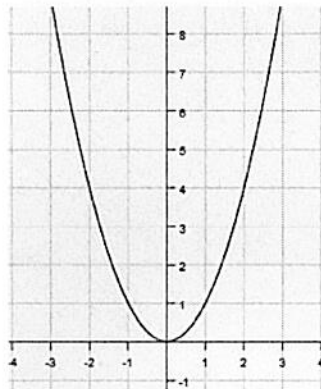


23.  $f(x) = (x+5)^2$

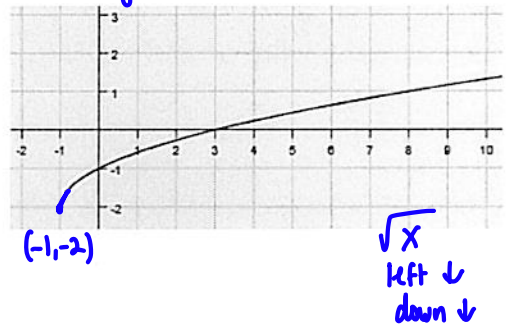


$x^2$   
left 5

24. \_\_\_\_\_



25.  $y = \sqrt{x+1} - 2$



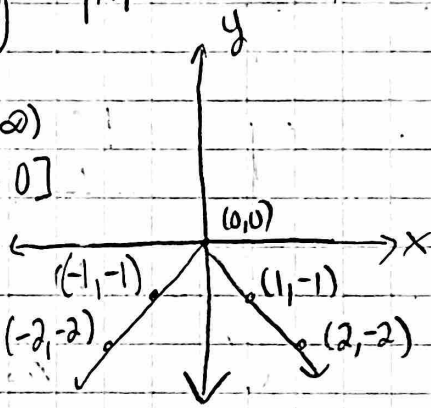
$\sqrt{x}$   
left ↓  
down ↓

# Homework 11-16

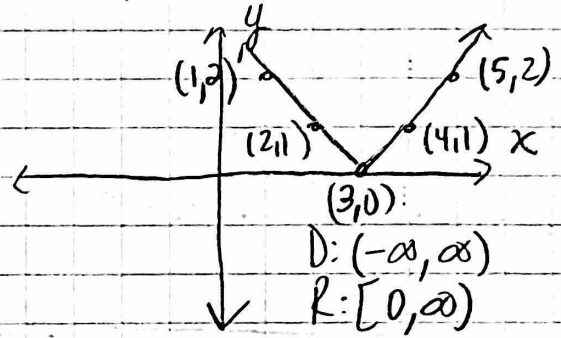
\*this is the key to the entire sheet \*

① (a)  $y = -|x|$

D:  $(-\infty, \infty)$   
R:  $(-\infty, 0]$

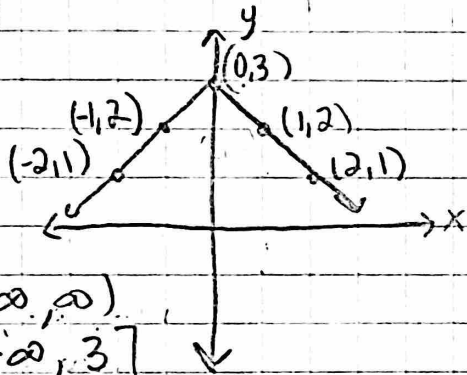


(b)  $y = |3-x| = |x-3|$

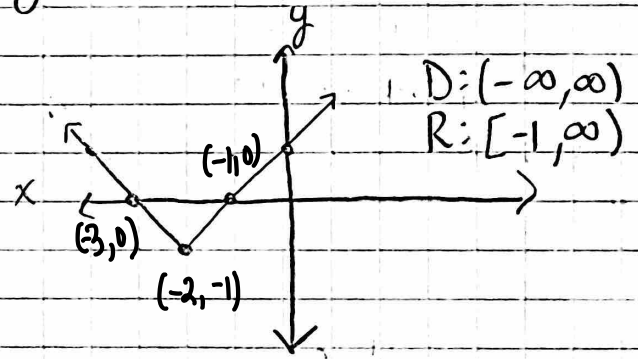


(c)  $y = 3 - |x| = -|x| + 3$

D:  $(-\infty, \infty)$   
R:  $(-\infty, 3]$

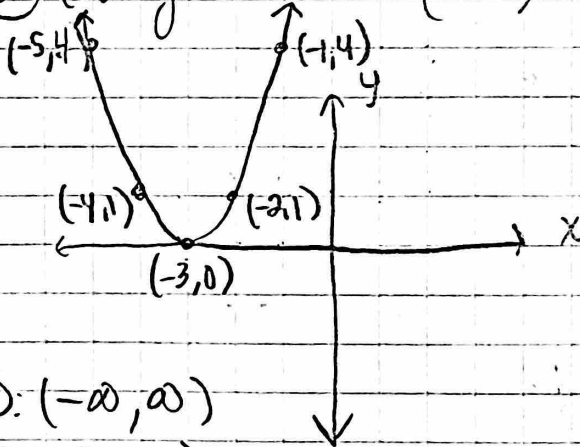


(d)  $y = |x+2| - 1$



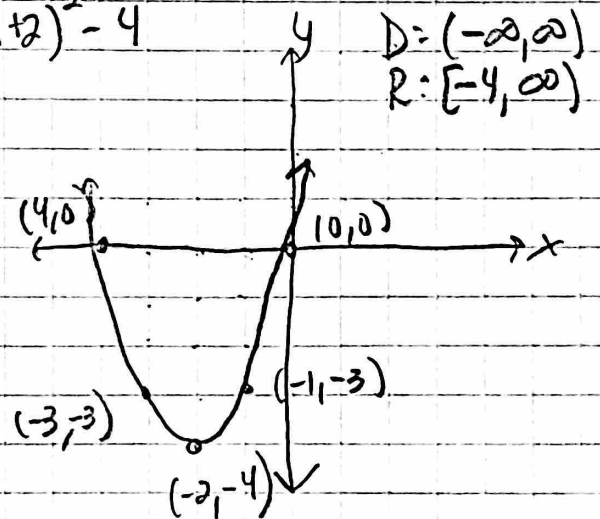
② (i)  $y = x^2 + 6x + 9 = (x+3)^2$

D:  $(-\infty, \infty)$   
R:  $[0, \infty)$



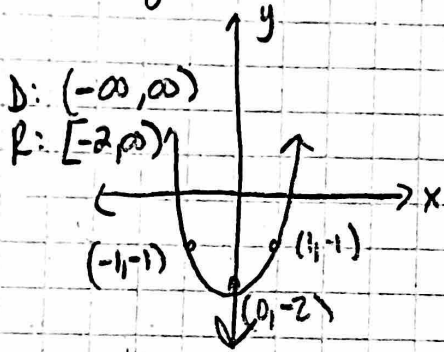
(j)  $y = x^2 + 4x + 4 - 4$

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

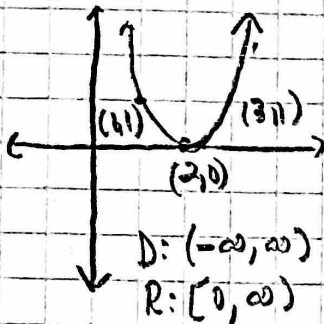


\* Be careful when checking answers to #2. #2 is a little out of order on this key

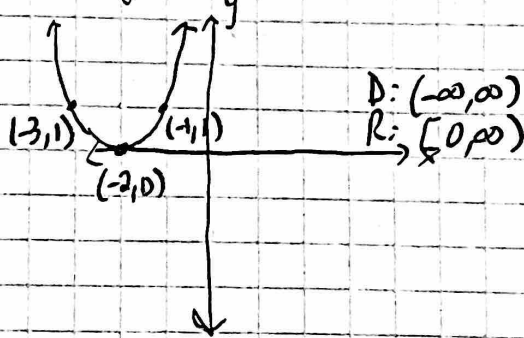
2(a)  $y = x^2 - 2$



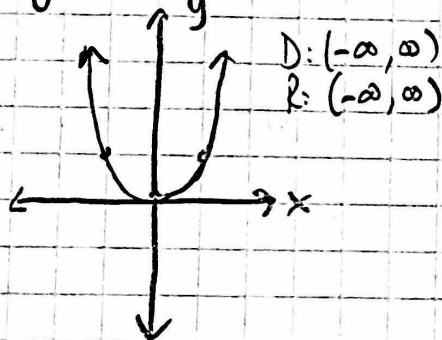
(b)  $y = (x-2)^2$



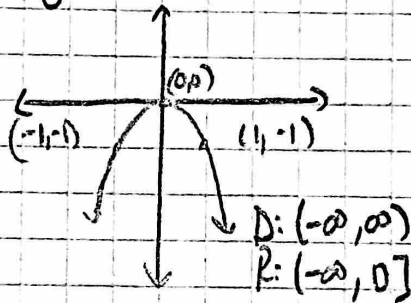
(c)  $y = (x+2)^2$



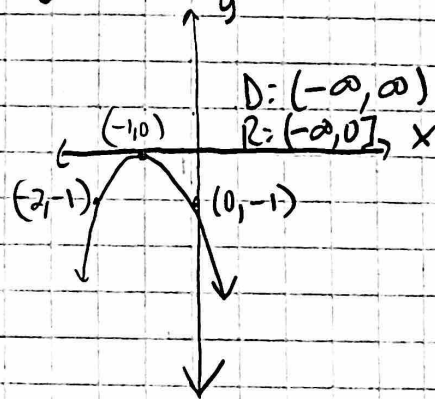
(d)  $y = (-x)^2$



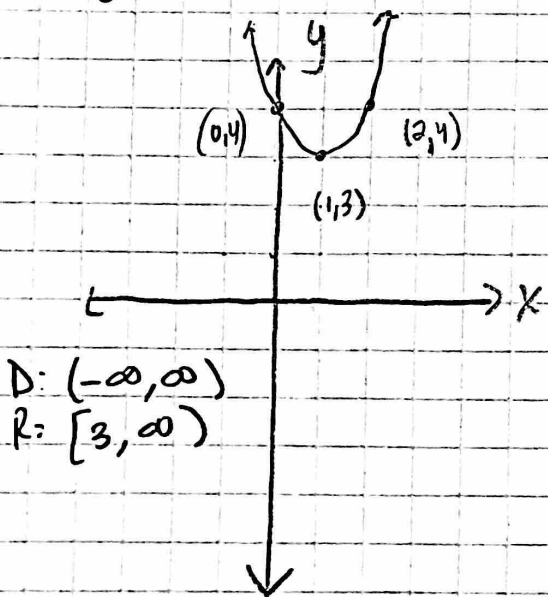
(e)  $y = -x^2$



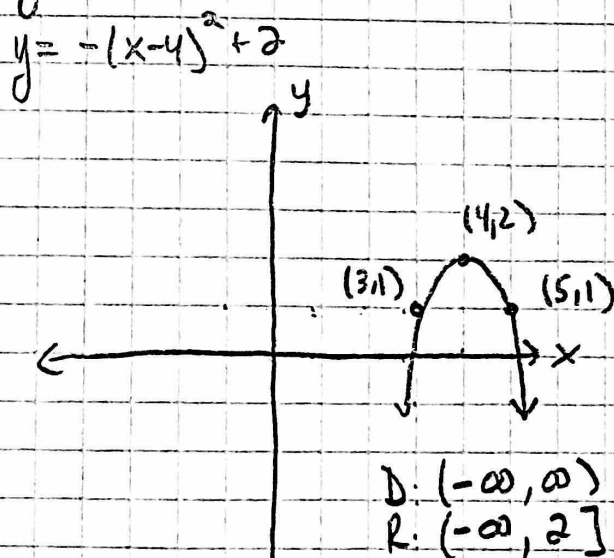
(f)  $y = -(x+1)^2$



(g)  $y = (x-1)^2 + 3$



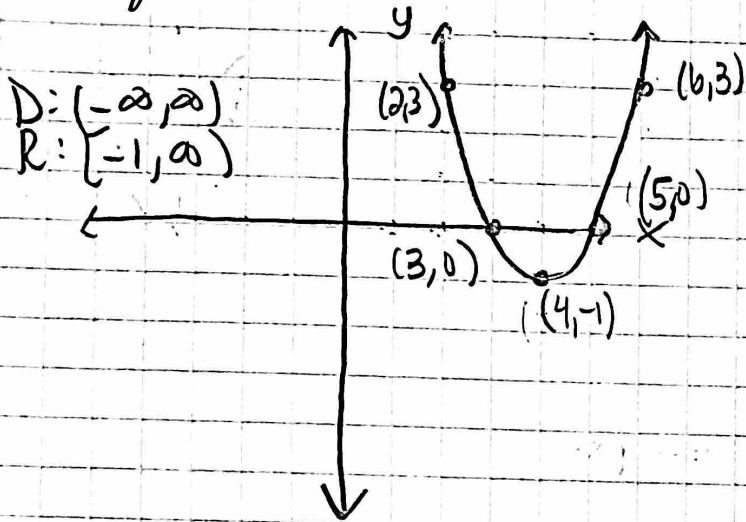
(h)  $y = 2 - (x-4)^2$



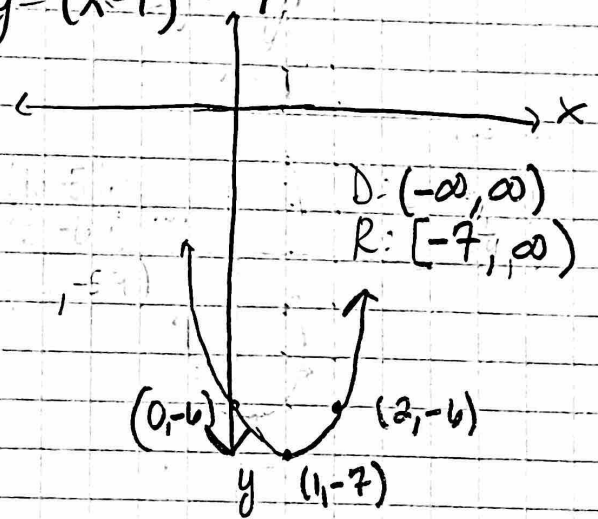
(i) and (j) are on the previous page.

②

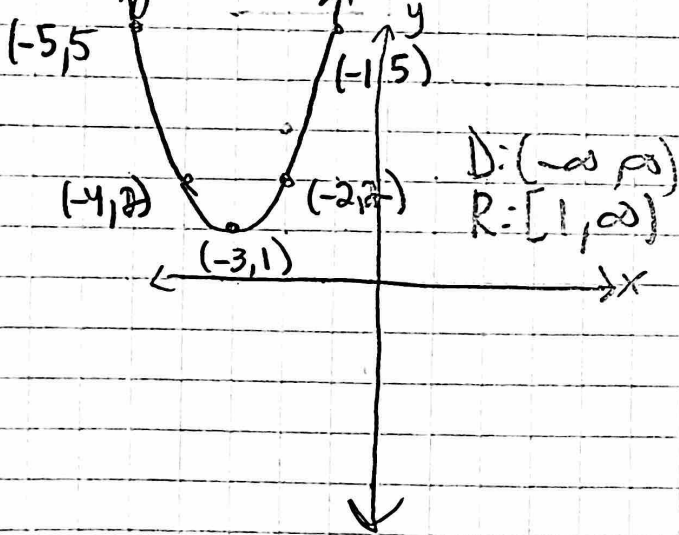
(k)  $y = x^2 - 8x + 16 = -16 + 15$   
 $y = (x-4)^2 - 1$



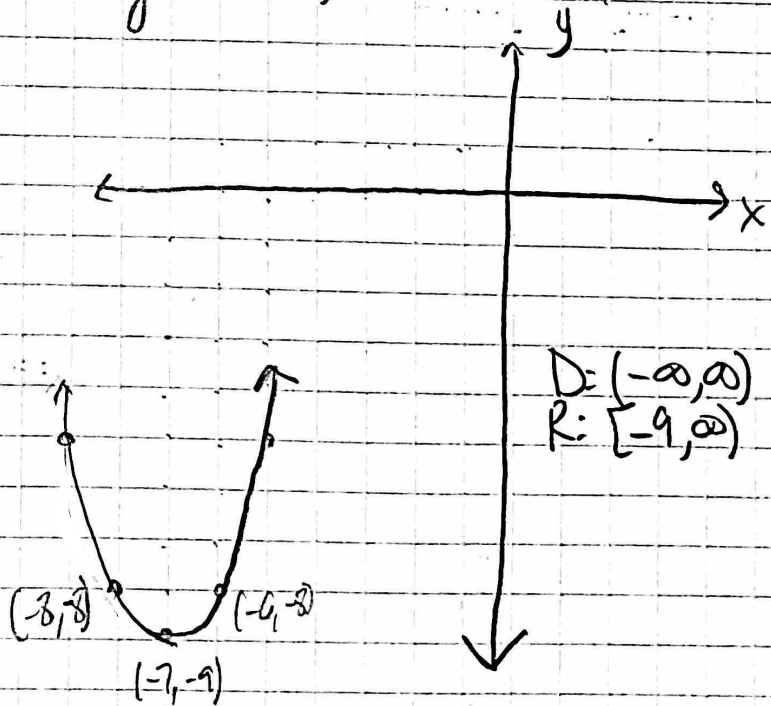
(l)  $y = x^2 - 2x + 1 = -1 - 6$   
 $y = (x-1)^2 - 7$



(m)  $y = x^2 + 6x + 9 = 9 + 10$   
 $y = (x+3)^2 + 1$

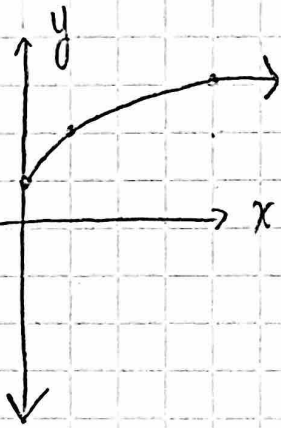


(n)  $y = x^2 + 14x + 49 = -49 + 40$   
 $y = (x+7)^2 - 9$



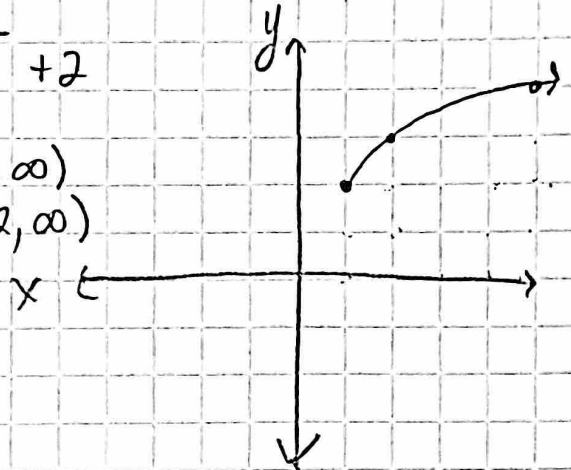
③ (a)  $y = \sqrt{x} + 1$

D:  $[0, \infty)$   
R:  $[1, \infty)$



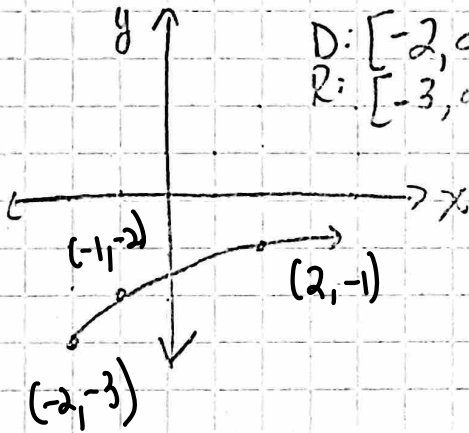
(b)  $y = \sqrt{x-1} + 2$

D:  $[1, \infty)$   
R:  $[2, \infty)$



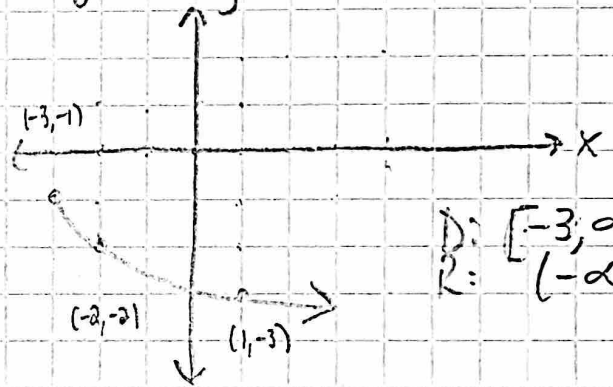
(c)  $y = \sqrt{x+2} - 3$

D:  $[-2, \infty)$   
R:  $[-3, \infty)$



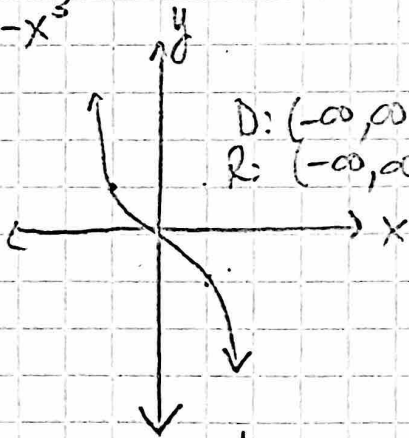
(d)  $y = -\sqrt{x+3} - 1$

D:  $[-3, \infty)$   
R:  $(-\infty, -1]$



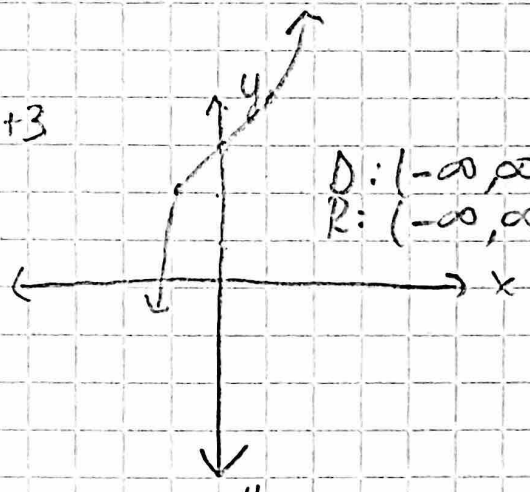
④ (a)  $y = -x^3$

D:  $(-\infty, \infty)$   
R:  $(-\infty, \infty)$



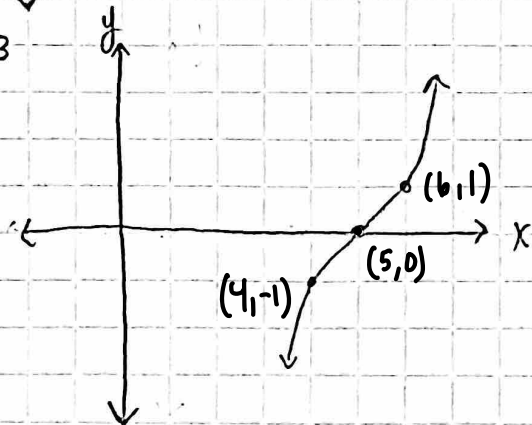
(b)  $y = x^3 + 3$

D:  $(-\infty, \infty)$   
R:  $(-\infty, \infty)$



(c)  $y = (x-5)^3$

D:  $(-\infty, \infty)$   
R:  $(-\infty, \infty)$



(d)  $y = (-x)^3$

D:  $(-\infty, \infty)$   
R:  $(-\infty, \infty)$

