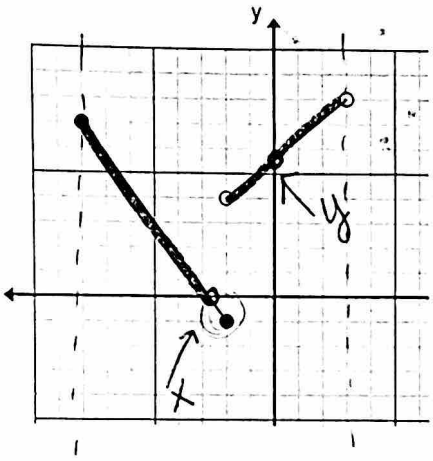
**Finals Warm Up Ch 1A, 1B, 2A**

1. Use the graph below to find the following part of the graph.




a. Domain: $[-8, 3)$
L→R

b. Range: $[-1, 8)$

c. Positive Interval: $[-8, -3)$
above x-axis
x-values
$(-2, 3)$

d. Negative Interval: $(-3, -2]$

e. Increasing Interval: $(-2, 3)$
run uphill

f. Decreasing Interval: $[-8, -2]$
run downhill

x-values

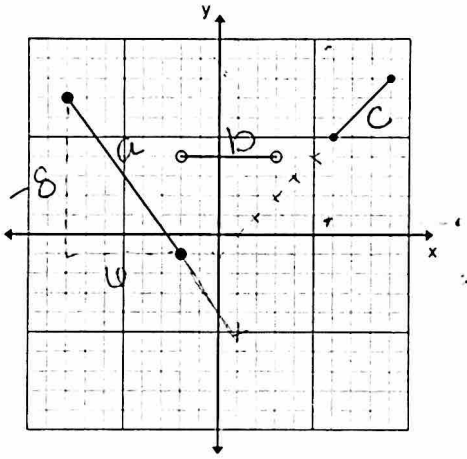
g. x-intercept(s):
$(-3, 0)$

h. y-intercept(s):
$(0, 5.5)$

2. Write the rule that defines the graph.

lines
$y = mx + b$

horizontal lines
$y = \#$

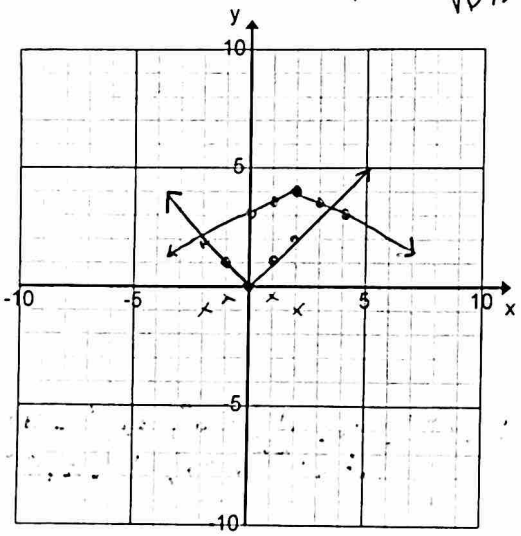



$$f(x) = \begin{cases} -\frac{4}{3}x - 4 & [-8, -2] \\ 4 & (-2, 3) \\ x - 1 & [6, 9] \end{cases}$$

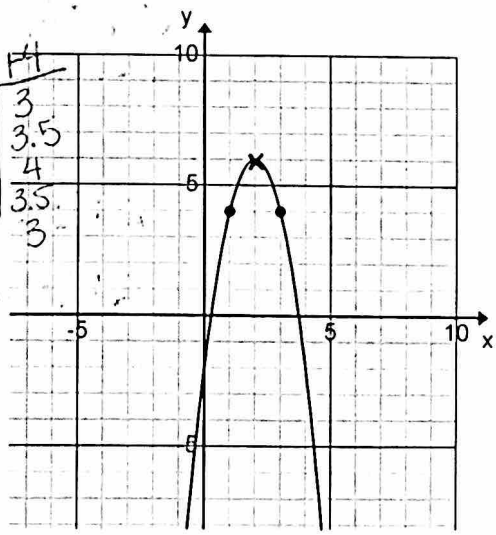
3. Sketch a complete graph of $h(x) = -\frac{1}{2}|x-2| + 4$ and list the transformations.

over x-axis
VD 1/2
R2
U4

| +2 | x | y | ·-1 | ·1/2 | +4 |
|---|---|---|---|---|---|
| 0 | -2 | 2 | -2 | -1 | 3 |
| 1 | -1 | 1 | -1 | -1/2 | 3.5 |
| 2 | 0 | 0 | 0 | 0 | 4 |
| 3 | 1 | 1 | -1 | -1/2 | 3.5 |
| 4 | 2 | 2 | -2 | -1 | 3 |




4. Find the equation of the graph.




$y = -2(x-2)^2 + 6$

5. Graph the following function. $f(x)=\begin{cases} -x+1 & -5\le x<-3 \quad a \\ x & -3\le x\le 0 \quad b \\ 4 & 0<x<4 \quad c \end{cases}$

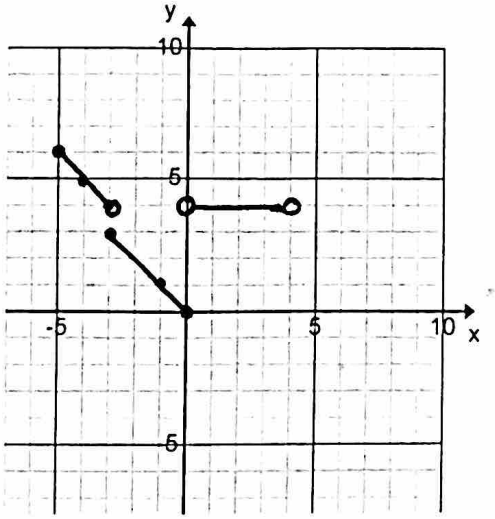
a: $y=-x+1$

| x | y |
|---|---|
| • -5 | 6 |
| -4 | 5 |
| o -3 | 4 |

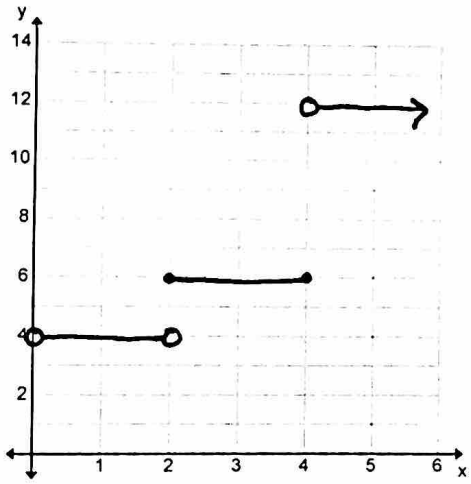
b: $y=x$

| x | y |
|---|---|
| • -3 | -3 |
| -1 | -1 |
| • 0 | 0 |

c: $y=4$




6. The following chart shows the price for parking (y) given the hours (x). Graph the corresponding step-function.




| Hours | Price |
|---|---|
| Less than 2 hours | $4 |
| From 2 to 4 hours | $6 |
| More than 4 hours | $12 |

7. Find the average rate of change from [0,2] for #4's graph

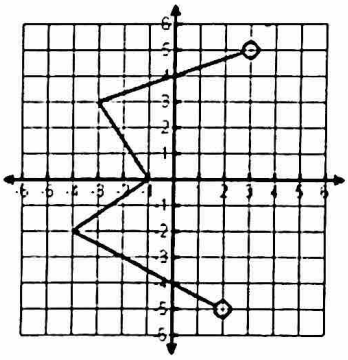
slope x-values

(0, -2)
(2, 6)

$ARC = \frac{6-(-2)}{2-0} = \frac{8}{2} = \boxed{4}$

Find the domain & range of the following graphs:

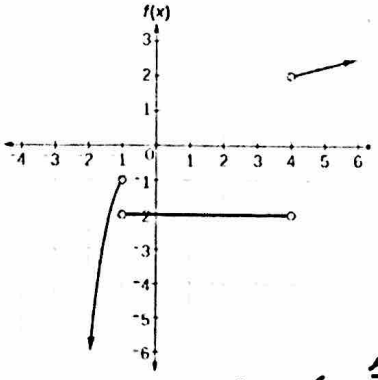
8.



D: [-4,3)

R: (-5,5)

9.




D: $(-\infty,-1)\cup(-4,4)\cup(4,\infty)$

R: $(-\infty,-1)\cup(2,\infty)$

10. Find the intersection (solve for x) using your **graphing calculator**: $x^3-4x-2=-|x-1|$

11. Write the general formulas for the following:

a. Recursive Formula:

$$a_n = \begin{cases} a_1 & n=1 \\ a_{n-1} + \text{rule} & n>1 \end{cases}$$

b. Explicit Formula:

$$a_n = a_1 + \text{rule}(n-1)$$

c. Sum Equation:

$$S_n = \sum_{n=1}^{\text{\# of terms}} \text{exp. formula}$$

12. Given $-20, -16, -12 \ldots$:

a. write the recursive formula.

$$a_n = \begin{cases} -20, & n=1 \\ a_{n-1} + 4, & n>1 \end{cases}$$

b. write the explicit formula.

$$a_n = -20 + 4(n-1)$$

c. find $a_{96}$.

$$a_{96} = -20 + 4(96-1)$$

$$a_{96} =$$

13. You are working at Chipotle and the manager asked you to stack the cans of beans in the back room but he likes everything in pyramids. The top layer needs to have 5 cans and the 7th row needs to have 29 cans. Find the following pieces of information:

$a_1 = 5$

$a_7 = 29$

$\text{rule} = \frac{29-5}{7-1} = \frac{24}{6} = 4$

a. the explicit formula.

$$a_n = 5 + 4(n-1)$$

b. How many cans are in the 11th row?

$$a_{11} = 5 + 4(10) = \boxed{45}$$

c. The total number of cans used for 17 rows.

$$a_{17} = 5 + 4(16) = 69$$

$$S_{17} = \frac{17(5+69)}{2} = \boxed{629}$$

Evaluate the following:

14. $\sum_{n=1}^{14} [7 - 2(n-1)]$

$$S_{14} = \frac{14(7 + -19)}{2} = \boxed{-84}$$

15. $\sum_{n=1}^{22} (3 + 6n)$

$$S_{22} = \frac{22(9 + 135)}{2} = \boxed{1{,}584}$$

Write the following using sigma notation & evaluate

16. $17 + 15 + 13 + \ldots + a_{17}$

$$\sum_{n=1}^{17} (17 - 2(n-1))$$

$$S_{17} = \frac{17(17 + (-17))}{2} = \boxed{8.5}$$

17. $-6 - 2 + 2 + \ldots + 94$

$94 = -6 + 4(n-1)$

$100 = 4(n-1)$

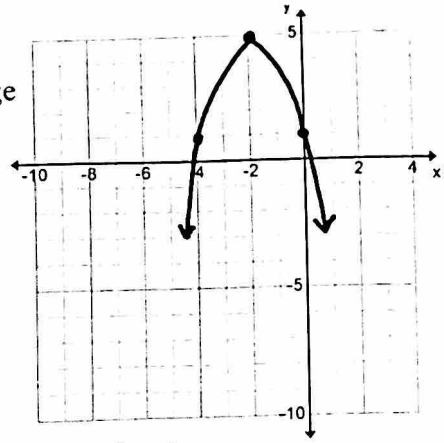
$25 = n-1$

$26 = n$

$$\sum_{n=1}^{26} -6 + 4(n-1) = \boxed{1{,}144}$$

18. Use your **graphing calculator** to find the following interval(s): $x^2 - 9 < 0$ (AKA negative interval)

19. Graph $y=-x^2-4x+1$ identify the vertex, axis of symmetry, domain & range




vertex: $x = -b/2a = 4/2(-1) = -2$ $(-2,5)$

$y = -(-2)^2 - 4(-2) + 1 = 5$

AoS: $x = -2$

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

R: $(-\infty, 5]$

20. Use $y = 0.5(x-5)^2 + 17$ to answer the following questions:

Vertex: $(5, 17)$ Axis of Symmetry: $x = 5$ Max or Min min

Domain: $(-\infty, \infty)$ Range: $[17, \infty)$

21. Find the equation of the quadratic in vertex form and standard form that has a vertex at (1,-4) & goes through the point (-2,-1).

$y = a(x-1)^2 - 4$

$-1 = a(-2-1)^2 - 4$

$3 = 9a$

$1/3 = a$

$\boxed{VF: y = 1/3(x-1)^2 - 4}$

$y = 1/3(x^2 - 2x + 1) - 4$

$y = 1/3x^2 - 2/3x + 1/3 - 4$

$\boxed{y = 1/3x^2 - 2/3x - 11/3}$

22. Molly Moon's Ice Cream's profit equation is $f(x) = -5x^2 + 240x - 1000$.

a. How many ice scoops would they need to sell to make a maximum profit?

$x = -b/2a = -240/2(-5) = \boxed{24 \text{ SCOOPS}}$

b. What is their maximum profit?

$y = -5(24)^2 + 240(24) - 1000 = \$$

23. Write the factored form equation of the quadratic given Roots of the graph are $x = 3$ & $x = -2$ and that the graph goes through (2,-7).

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

$-7 = a(2-3)(2+2)$

$-7 = a(-1)(4)$ $a = 7/4$

$\boxed{y = 7/4(x-3)(x+2)}$

24. Factor $2x^2 + 17x + 21$

$ac = 42$, $b = 17$ } 14 & 3

$2x^2 + 14x + 3x + 21$

$2x(x+7) + 3(x+7)$

$\boxed{(x+7)(2x+3)}$

25. The length of a rectangle is 5 inches more than twice a number. The width is 4 inches less than the same number. If the area of the rectangle is 15, find the number.

$\boxed{A = 15}$ $x - 4$

$2x + 5$

$(2x+5)(x-4) = 15$

$2x^2 - 3x - 20 = 15$

$2x^2 - 3x - 35 = 0$

$(2x+7)(x-5) = 0$

$\cancel{x = -7/2}$ $\boxed{x = 5}$