Unit 2 Packet – Graphs of Functions
Pre-Calculus Honors

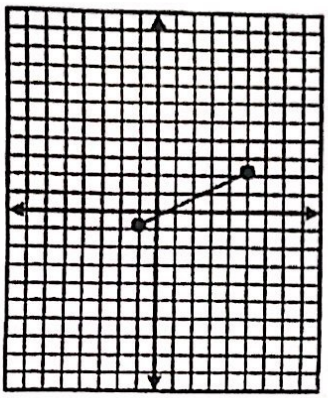
Name: Key!

Day 1: Domain, Range, and Symmetry

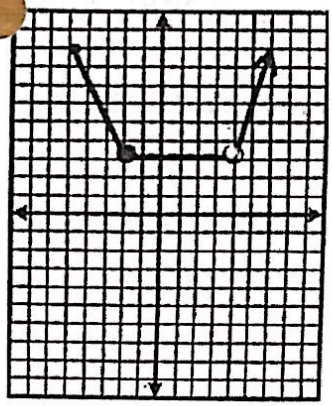
Interval Notation:

- When the value is NOT a part of the function – "open" ... use ( )
- When the value IS a part of the functions – "closed" ... use [ ]
- When there is a JUMP in the function – "OR" ... use "union" ∪

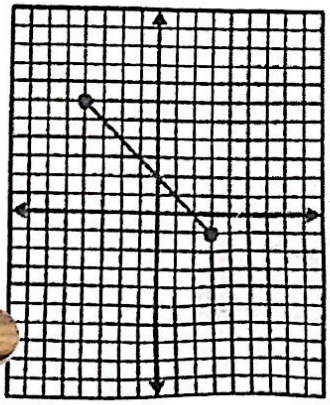
ex: (#, #] ∪ (#, ∞)



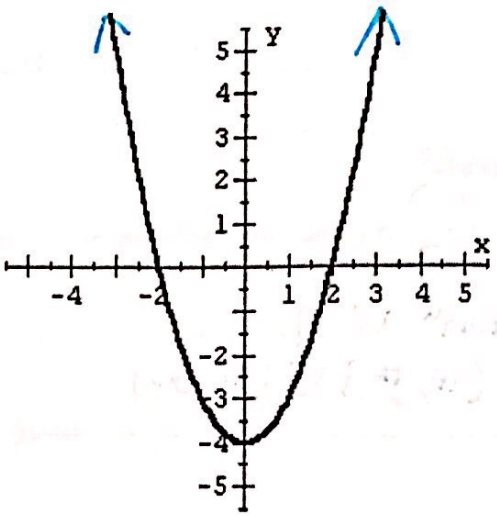
Domain: [−1, 5]
Range: [−1, 2]
Increasing: (−1, 5)
Decreasing: —
Constant: —
Extrema: Abs. Max.: (5, 2), Abs. Min.: (−1, −1)
Boundedness: Bounded
Continuity: yes



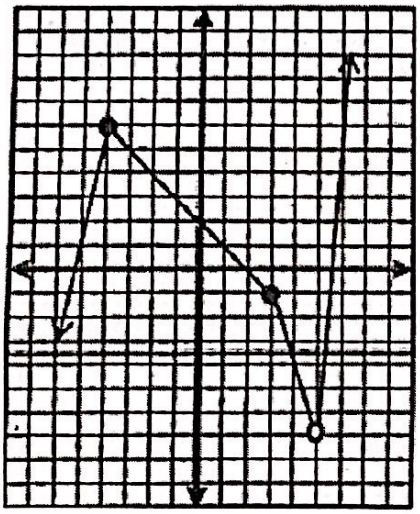
Domain: [−5, 4) ∪ (4, ∞)
Range: [3, ∞)
Increasing: (4, ∞)
Decreasing: (−5, −2)
Constant: (−2, 4)
Extrema: —
Boundedness: Bounded Below
Continuity: Disc. @ x = 4 (Remov. Hole: (4, 3))



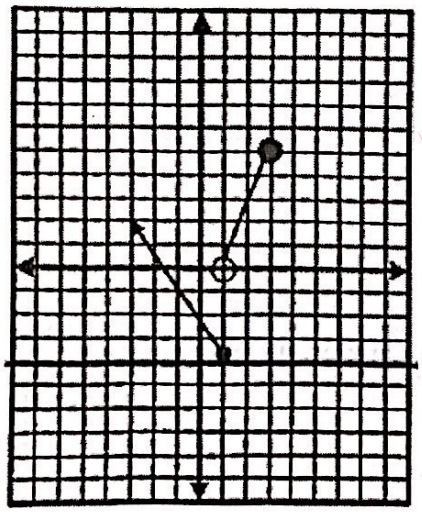
Domain: [−4, 3]
Range: [−1, 6]
Increasing: —
Decreasing: (−4, 3)
Constant: —
Extrema: Abs. Max.: (−4, 6), Abs. Min.: (3, −1)
Boundedness: Bounded
Continuity: yes



Domain: $(-\infty, \infty)$ ← "All Real #'s"
Range: $[-4, \infty)$
Increasing: $(0, \infty)$
Decreasing: $(-\infty, 0)$
Constant: —
Extrema: Abs. Min.: $(0, -4)$
Boundedness: Bounded Below
Continuity: yes



Domain: ~~$(-\infty, \infty)$~~ $(-\infty, 5) \cup (5, \infty)$
Range: $(-\infty, \infty)$
Increasing: $(-\infty, -4) \cup (5, \infty)$
Decreasing: $(-4, 5)$
Constant: —
Extrema: Local Max.: $(-4, 6)$, Local Min.: —
Boundedness: —
Continuity: Disc. @ $x = 5$ (Rem. Hole: $(5, -7)$)



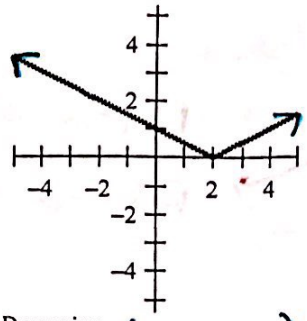
Domain: $(-\infty, 3]$
Range: $[-4, \infty)$
Increasing: ~~$(-\infty, 1)$~~ $(1, 3)$
Decreasing: $(-\infty, 1)$
Constant: —
Extrema: Abs. Min.: $(1, -4)$
Boundedness: Bounded Below
Continuity: Disc. @ $x = 1$ (N.R. jump)

Precalculus HW (Day 1)

Domain & Range Name:_____

Use interval notation to write the domain and range of the functions graphed below.

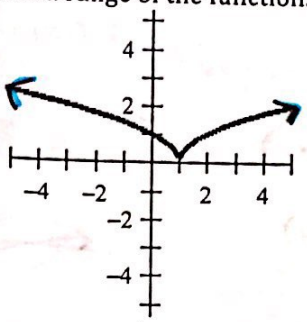
1.



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

Range: $[0, \infty)$

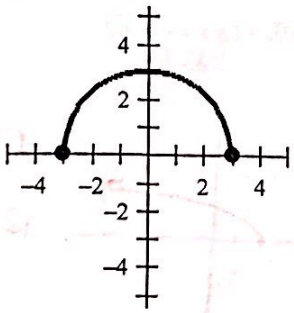
2.



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

Range: $[0, \infty)$

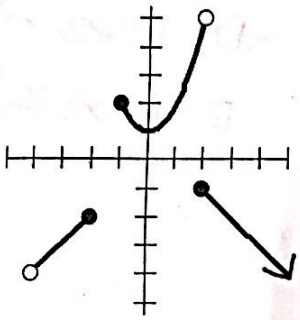
3.



Domain: $[-3, 3]$

Range: $[0, 3]$

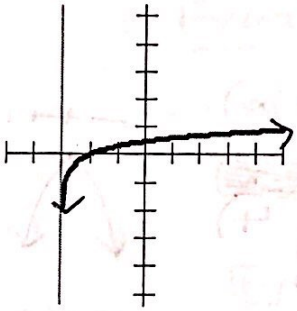
4.



Domain: $(-4, -2] \cup [-1, \infty)$

Range: $(-\infty, -1] \cup [1, 5)$

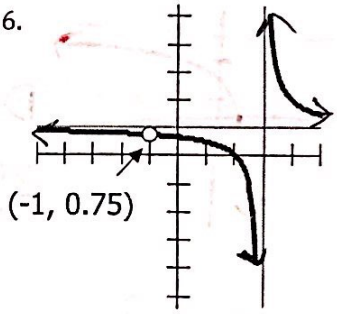
5.



Domain: $(-3, \infty)$

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

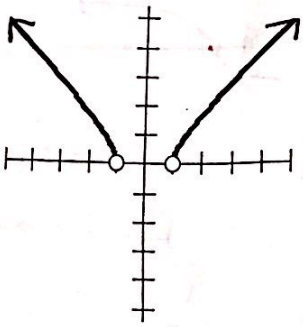
6.



Domain: $(-\infty, -1) \cup (-1, 3) \cup (3, \infty)$

Range: $(-\infty, 0.75) \cup (.75, 1) \cup (1, \infty)$

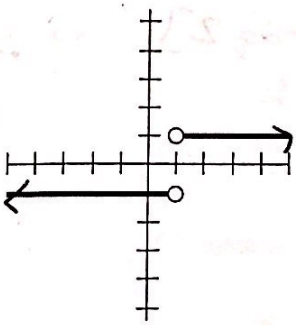
7.



Domain: $(-\infty, 1) \cup (1, \infty)$

Range: $(0, \infty)$

8.

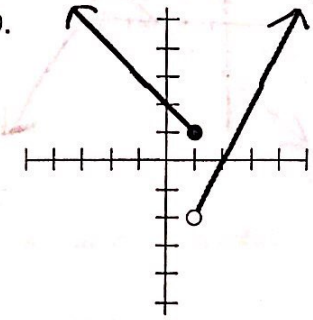


Domain: $(-\infty, 1) \cup (1, \infty)$

Range: $[-1] \cup [1]$

or $\{-1, 1\}$.

9.



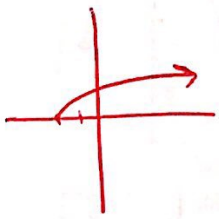
Domain: $(-\infty, \infty)$

Range: $(-2, \infty)$

Precalculus

Use a graphing calculator to sketch the following functions. Then write the domain and range in interval notation.

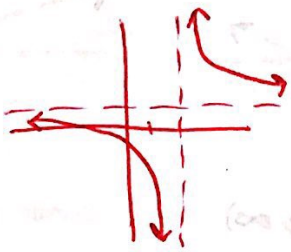
10. $f(x)=\sqrt{x+2}$



D: $[-2,\infty)$

R: $[0,\infty)$

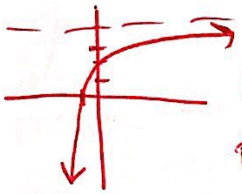
11. $f(x)=\dfrac{x+1}{x-2}$



D: $(-\infty,2)\cup(2,\infty$

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

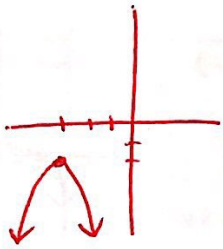
12. $f(x)=-2^{1-x}+4$



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

R: $(-\infty,4)$

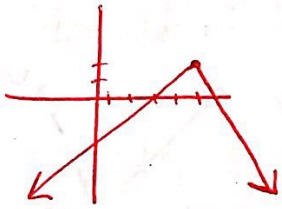
13. $f(x)=-(x+3)^2-2$



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

R: $(-\infty,2]$

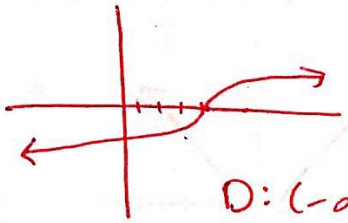
14. $f(x)=-|x-5|+2$



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

R: $(-\infty,2]$

15. $f(x)=\sqrt[3]{x-4}$



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

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

Practice with Symmetry of Functions

$f(x) = f(-x)$ → $f(-x) = -f(x)$

Decide algebraically if the function is even, odd, or neither.

1. $f(x) = x^3 - 4x$

Even?

$f(-x) = (-x)^3 - 4(-x)$

$= -x^3 + 4x$

$\neq x^3 - 4x$

∴ not even

Odd?

$-f(x) = -(x^3 - 4x)$

$= -x^3 + 4x$

$= f(-x)$ ✓

∴ odd

2. $f(x) = \frac{x}{1+x^2}$

Even?

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

$= \frac{-x}{1+x^2}$

∴ not even

Odd?

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

$= \frac{-x}{1+x^2}$

∴ odd

3. $f(x) = x^5 + 7x^2 + 3x + 5$

Even?

$f(-x) = (-x)^5 + 7(-x)^2 + 3(-x) + 5$

$= -x^5 + 7x^2 - 3x + 5 \neq f(x)$

$-f(x) = -(x^5 + 7x^2 + 3x + 5)$ ← odd?

$= -x^5 - 7x^2 - 3x - 5 \neq f(-x)$

∴ Neither

4. $f(x) = 3x^4 + 3$

Even?

$f(-x) = 3(-x)^4 + 3$

$= 3x^4 + 3$

$= f(x)$ ✓

∴ even

5. $f(x) = 3x^4 - 5x^2 + 17$

Even?

$f(-x) = 3(-x)^4 - 5(-x)^2 + 17$

$= 3x^4 - 5x^2 + 17 = f(x)$ ✓

∴ even

6. $f(x) = 4x^3 - 7$

neither

Even?

$f(-x) = 4(-x)^3 - 7$

$= -4x^3 - 7$

$\neq f(x)$

∴ not even

Odd?

$-f(x) = -(4x^3 - 7)$

$= -4x^3 + 7$

$\neq f(-x)$

∴ not odd

7. $f(x) = \frac{x^2-5}{2x^3+x}$

Even?

$f(-x) = \frac{(-x)^2-5}{2(-x)^3+(-x)} = \frac{x^2-5}{-2x^3-x} \neq f(x)$

∴ not even

Odd?

$-f(x) = \frac{-(x^2-5)}{2x^3+x} = \frac{x^2-5}{-(2x^3+x)} = \frac{x^2-5}{-2x^3-x} = f(-x)$

8. Create your own function with even symmetry.

Answers vary.

$f(x)$ must equal $f(-x)$