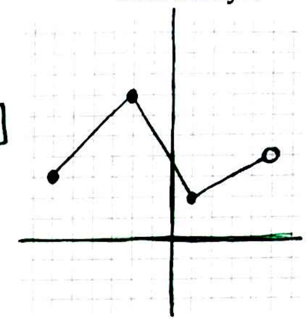
Name____________________________

Pre-Calculus Honors **Ms. Hindal**
Objective 1.5: Domain Restriction **Unit 1 Day 5**

Do Now:



1. Objective 1.3: Find domain, range, where the function at right is increasing and decreasing
   D: $[-6,5)$ R: $[2,7]$ Incr: $[-6,-2] \cup [1,5)$ Decr: $[-2,1]$
2. Objective 1.4: Which of the nine basic parent functions (linear, square, cube, square root, absolute value, reciprocal, exponential, natural logarithm, logistic) have end behavior: $x \to \infty$ $f(x) \to \infty$ (try to do it without looking at the functions! picture them in your head instead!)

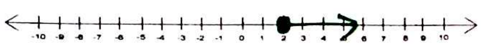
3. **ACT question of the day:** For all x, $x^2 - (3x - 2) + 2x(4x - 1) =$

A. $x^2 - 5x - 2$ B. $9x^2 + 5x - 2$ C. $9x^2 - 5x + 2$ D. $8x^2 - 3x$ E. $9x^2 - 4x + 2$

Mini lesson:
Solving inequalities: Solve for x

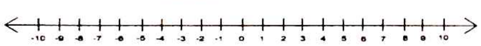
1. $3x - 4 \ge 2$

$3x \ge 6$
$x \ge 2$ $\boxed{[2,\infty)}$



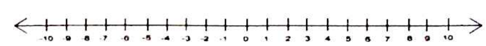
2. $3 - 2x < 7$

$3-2x < 7$
$-2x < 4$
$\boxed{x > -2}$



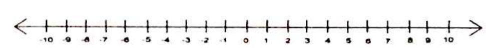
3. $x^2 > 16$

$x > 4$ or $x < -4$



4. $|x| \le 8$

$x \le 8$
$x \ge -8$



Domain Restriction: *2 rules*

Rule #1: We can't divide **by** zero

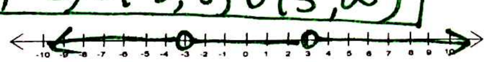
Functions only exist when the denominator does not equal 0

Find the domain of the function

2. $f(x) = (x + 2)/(x^2 - 9)$

f(x) exists: $x^2 - 9 \neq 0$
$x^2 \neq 9$
$x \neq \pm 3$

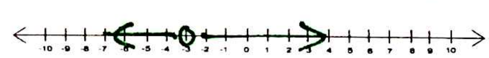
D: $\boxed{(-\infty,-3) \cup (-3,3) \cup (3,\infty)}$



4. $f(x) = 17/(x + 3)$

f(x) exists: $x + 3 \neq 0$
$x \neq -3$

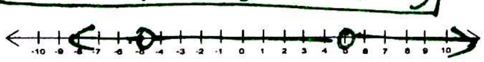
D: $\boxed{(-\infty,-3) \cup (-3,\infty)}$



3. $f(x) = 7/(|x| - 5)$

f(x) exists: $|x| - 5 \neq 0$
$|x| \neq 5$
$x \neq \pm 5$

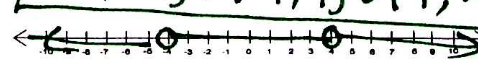
D: $\boxed{(-\infty,-5) \cup (-5,5) \cup (5,\infty)}$



5. $f(x) = 7/(2|x| - 8)$

f(x) exists: $2|x| - 8 \neq 0$
$2|x| \neq 8$
$|x| \neq 4 \rightarrow x \neq \pm 4$

D: $\boxed{(-\infty,-4) \cup (-4,4) \cup (4,\infty)}$



Rule # 2: We can't take the square root **of a** negative **number**

Functions only exist when the input to the square root is greater than or equal to 0

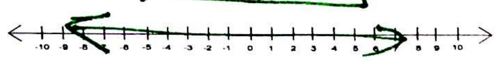
2. f(x) = x³ – 2x + √(x² + 5)

f(x) exists: $x^2 + 5 \geq 0$

$x^2 \geq -5$

always true → doesn't restrict x

D: $\boxed{(-\infty, \infty)}$



4. f(x) = x² + 2 + √(x + 7)

f(x) exists: $x + 7 \geq 0$

$x \geq -7$

$\boxed{D: [-7, \infty)}$

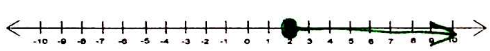
3. f(x) = 2 + √(x³ – 8)

f(x) exists: $x^3 - 8 \geq 0$

$x^3 \geq 8$

$x \geq 2$

$\boxed{D: [2, \infty)}$



5. f(x) = 5x – 3 + √(x² – 100)

f(x) exists: $x^2 - 100 \geq 0$

$x^2 \geq 100$

$x \geq 10$ or $x \leq -10$

D: $\boxed{(-\infty, -10) \cup (10, \infty)}$

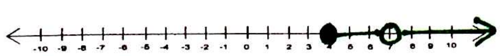
Multiple rules

1. f(x) = √(x – 4) / (x - 7)

f(x) exists: $x - 4 \geq 0$ and $x - 7 \neq 0$

$x \geq 4$ $\quad$ $x \neq 7$

$\boxed{D: [4, 7) \cup (7, \infty)}$

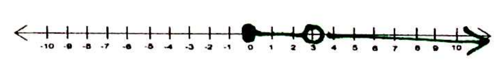


3. f(x) = √x / (x - 3)

f(x) exists: $x \geq 0$ and $x - 3 \neq 0$

$x \geq 0$ and $x \neq 3$

$\boxed{D: [0, 3) \cup (3, \infty)}$



2. f(x) = 1 / √(1 – x²)

f(x) exists: $1 - x^2 \geq 0$ and $\sqrt{1 - x^2} \neq 0$

$1 \geq x^2$ $\quad$ $1 - x^2 \neq 0$

$1 \geq x$ and $\quad$ $1 \neq x^2$

$-1 \leq x$ $\quad$ $x \neq \pm 1$

$\boxed{D: (-1, 1)}$

4. f(x) = √(x + 2) + 1/x

f(x) exists: $x + 2 \geq 0$ and $x \neq 0$

$x \geq -2$ and $x \neq 0$

$\boxed{D: [-2, 0) \cup (0, \infty)}$

Homework:

Section 1.2 Quick Review, Page 101 – 5, 7, 9; Section 1.2 Exercises, Page 102 – 12