Pre-Calculus
UNIT 1:

Name: Key
Date:

## FINDING DOMAIN ALGEBRAICALLY

### CASE 1: FRACTIONS

Directions: State the domain in interval notation.

1.) $y=\frac{1}{x}$ $x\neq 0$

$(-\infty,0)\cup(0,\infty)$

2.) $y=\frac{1}{x-2}$ $x\neq 2$

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

3.) $f(x)=\frac{8}{3x+9}$ $x\neq -\frac{9}{3}=-3$

$(-\infty,-3)\cup(-3,\infty)$

4.) $f(x)=\frac{x^3}{x^2-4x-96}$ $x^2-4x-96\neq 0$

$(x-12)(x+8)\neq 0$

$x\neq 12 \quad x\neq -8$

$(-\infty,-8)\cup(-8,12)\cup(12,\infty)$

5.) $y=\frac{6x}{x^2+7x+12}\neq 0$

$(x+3)(x+4)\neq 0$

$x\neq -3 \quad x\neq -4$

$(-\infty,-4)\cup(-4,-3)\cup(-3,\infty)$

6.) $y=\frac{3x^2-8x}{2x^2-5x-3}\neq 0$

$(2x-3)(x-1)\neq 0$

$x\neq \frac{3}{2} \quad x\neq 1$

$(-\infty,1)\cup(1,\frac{3}{2})\cup(\frac{3}{2},\infty)$

### CASE 2: RADICALS

Directions: State the domain in interval notation.

7.) $y=\sqrt{x-3}$ $x-3\geq 0$

$x\geq 3$

$[3,\infty)$

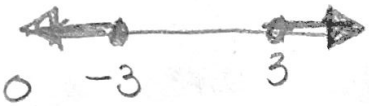
8.) $y=\sqrt{2x+8}$ $2x+8\geq 0$

$2x\geq -8$

$x\geq -4$

$[-4,\infty)$

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




$x^2-9\geq 0$

$x^2\geq 9$

$|x|\geq 3$ "greater"

$(-\infty,-3]\cup[3,\infty)$

10.) $y=\sqrt[3]{1-x^2}$

$(-\infty,\infty)$

11.) $f(x)=\sqrt{4-x^2}$


$4-x^2\geq 0$

$-x^2\geq -4$

flip inequality $\Leftrightarrow$ $x^2\leq 4$ ÷ by neg

$|x|\leq 2$

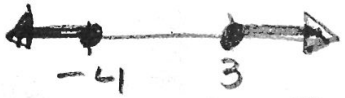
$-2\leq x\leq 2$

$[-2,2]$

12.) $f(x)=\sqrt{x^2+x-12}$

$x^2+x-12$

$(x+4)(x-3)\geq 0$




$(-\infty,-4]\cup[3,\infty)$

## CASE 3: FRACTION & RADICAL COMBINATION

Directions: State the domain in interval notation.

13.) $f(x)=\frac{5}{\sqrt{2x-10}}$ $2x-10>0$, $x>5$, $(5,\infty)$

14.) $f(x)=\frac{9}{\sqrt{x^2-144}}$ $x^2-144>0$, $x^2>144$, $x<-12$ or $x>12$, $(-\infty,-12)\cup(12,\infty)$

15.) $f(x)=\frac{11}{\sqrt{x^2-100}}$ $x^2-100>0$, $x^2>100$, $|x|>10$, $x<-10$ or $x>10$, $(-\infty,-10)\cup(10,\infty)$

16.) $y=\frac{\sqrt{x^2-36}}{2x-8}$ $x^2-36\geq 0$, $x^2\geq 36$, $|x|\geq 6$, $x\leq -6$ or $x\geq 6$; $2x-8\neq 0$, $x\neq 4$; $(-\infty,-6]\cup[6,\infty)$

17.) $y=\frac{\sqrt{x^2-25}}{3x-24}$ $x^2-25\geq 0$, $x^2\geq 25$, $|x|\geq 5$, $x\leq -5$ or $x\geq 5$; $3x-24\neq 0$, $x\neq 8$; $(-\infty,-5]\cup[5,8)\cup(8,\infty)$

18.) $y=\frac{\sqrt{9-x^2}}{x^2+7x+10}$ $9-x^2\geq 0$, $-x^2\geq -9$, $x^2\leq 9$, $|x|\leq 3$, $-3\leq x\leq 3$; $(x+5)(x+2)\neq 0$, $x\neq -5$, $x\neq -2$; $[-3,-2)\cup(-2,3]$

MIXED PRACTICE: State the domain in interval notation.

19.) $y=\frac{5x^3-9}{x^3+13x^2+42x}$ $x^3+13x^2+42x\neq 0$, $x(x^2+13x+42)\neq 0$, $x(x+6)(x+7)\neq 0$, $x\neq 0$, $x\neq -6$, $x\neq -7$; $(-\infty,-7)\cup(-7,-6)\cup(0,\infty)$

20.) $f(x)=\frac{\sqrt{x^2-9x+8}}{x^2-16+63}$ $(x-1)(x-8)\geq 0$; $(x-7)(x-9)\neq 0$, $x\neq 7$, $x\neq 9$; $(-\infty,1]\cup[8,9)\cup(9,\infty)$

21.) $f(x)=\frac{\sqrt{x^2-7x-18}}{x^2-5x-14}$ $x^2-7x-18\geq 0$, $(x-9)(x+2)\geq 0$, $x=9$, $x=-2$, $x\leq -2$ or $x\geq 9$; $x^2-5x-14=0$, $(x-7)(x+2)=0$, $x\neq 7$, $x\neq -2$; $(-\infty,-2)\cup[9,\infty)$

22.) $f(x)=\sqrt{25-5x}$ $25-5x\geq 0$, $-5x\geq -25$, $x\leq 5$, $(-\infty,5]$

23.) $f(x)=8x^3-13x^2+9x-4$ $(-\infty,\infty)$

24.) $f(x)=\frac{x+9}{\sqrt{x^2+x-72}}$ $x^2+x-72\geq 0$, $(x+9)(x-8)\geq 0$, $-9$, $8$; $(-\infty,-9)\cup(8,\infty)$

25.) $f(x)=\frac{\sqrt{7x^2-31x-20}}{7x^2+9x}$ $(7x+4)(x-5)\geq 0$, $-\frac{9}{7}$, $-\frac{4}{7}$, $0$, $5$; $7x^2+9x=0$, $x(7x+9)=0$, $x\neq 0$, $x\neq -\frac{9}{7}$, $-\frac{9}{7}$, $0$; $(-\infty,-\frac{9}{7})\cup(-\frac{9}{7},-\frac{4}{7}]\cup[5,\infty)$

26.) $f(x)=\sqrt{8x^2-48x}$ $8x^2-48x\geq 0$, $8x(x-6)\geq 0$, $x\neq 0$, $x\neq 6$; $(-\infty,0]\cup[6,\infty)$