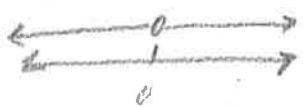


**FINDING DOMAIN ALGEBRAICALLY**  
**CASE 1: FRACTIONS**

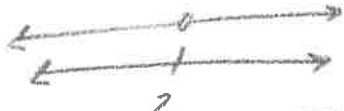
Directions: State the domain in interval notation.

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



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


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



$x \neq 2 \quad D: (-\infty, 2) \cup (2, \infty)$

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


$3x+9=0$   
 $3x=-9$   
 $x=-3$



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

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


$x^2-4x-96=0$   
 $(x-12)(x+8)=0$   
 $x=12, -8$



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

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

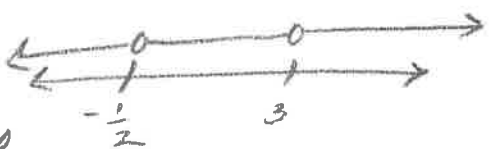
$x^2+7x+12=0$   
 $(x+3)(x+4)=0$   
 $x \neq -3, -4$



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

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

$3x^2-8x=0$   
 $x(3x-8)=0$   
 $x=0, \frac{8}{3}$



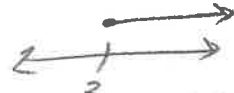
$x \neq -\frac{1}{2}, 3$   
 $D: (-\infty, -\frac{1}{2}) \cup (-\frac{1}{2}, 3) \cup (3, \infty)$

**CASE 2: RADICALS**

Directions: State the domain in interval notation.

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

$x-3 \geq 0$   
 $x \geq 3$



$D: [3, \infty)$

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

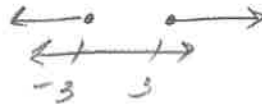
$2x+8 \geq 0$   
 $x \geq -4$



$D: [-4, \infty)$

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

$x^2-9=0$   
 $(x+3)(x-3)=0$   
 $x \neq -3, 3$



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

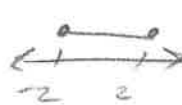
10.)  $y = \sqrt[3]{1-x^2}$

odd index

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

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

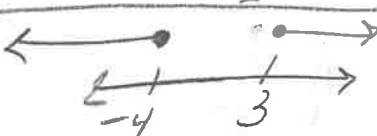
$4-x^2=0$   
 $x = \pm 2$



$D: [-2, 2]$

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

$(x-3)(x+4)=0$   
 $x = 3, -4$



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

CASE 3: FRACTION & RADICAL COMBINATION

Directions: State the domain in interval notation.

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

$2x-10 > 0$   
 $2x > 10$   
 $x > 5$   
 D: (5, ∞)

14.)  $f(x) = \frac{9}{\sqrt{x^2-144}}$

$x^2-144 = 0$   
 $x = \pm 12$   
 D: (-∞, -12) ∪ (12, ∞)

15.)  $f(x) = \frac{11}{\sqrt{x^2-100}}$

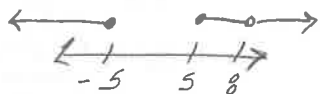
$x^2-100 = 0$   
 $x = \pm 10$   
 D: (-∞, -10) ∪ (10, ∞)

16.)  $y = \frac{\sqrt{x^2-36}}{2x-8}$

$x^2-36 = 0$   
 $x = \pm 6$   
 $2x-8 = 0$   
 $x \neq 4$   
 D: (-∞, -6] ∪ [6, ∞)

17.)  $y = \frac{\sqrt{x^2-25}}{3x-24}$

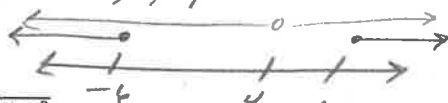
$x^2-25 = 0$   
 $x = \pm 5$   
 $3x-24 = 0$   
 $3x = 24$   
 $x \neq 8$



D: (-∞, -5] ∪ [5, 8) ∪ (8, ∞)

18.)  $y = \frac{\sqrt{9-x^2}}{x^2+7x+10}$

$9-x^2 = 0$   
 $x = \pm 3$   
 $x^2+7x+10 = 0$   
 $(x+5)(x+2) = 0$   
 $x \neq -5, -2$



D: [-3, -2) ∪ (2, 3]

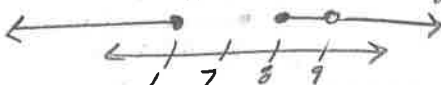
MIXED PRACTICE: State the domain in interval notation.

19.)  $y = \frac{5x^3-9}{x^3+13x^2+42x}$

$x^3+13x^2+42x = 0$   
 $x(x^2+13x+42) = 0$   
 $x(x+7)(x+6) = 0$   
 $x \neq 0, -7, -6$   
 D: (-∞, -7) ∪ (-7, -6) ∪ (-6, 0) ∪ (0, ∞)

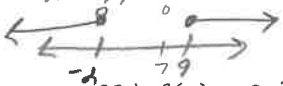
20.)  $f(x) = \frac{\sqrt{x^2-9x+8}}{x^2-16x+63}$

$x^2-9x+8 = 0$   
 $(x-8)(x-1) = 0$   
 $x \neq 8, 1$   
 $x^2-16x+63 = 0$   
 $(x-9)(x-7) = 0$   
 $x \neq 9, 7$   
 D: (-∞, 1] ∪ [9, 9) ∪ (9, ∞)



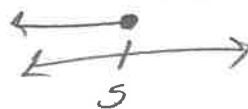
21.)  $f(x) = \frac{\sqrt{x^2-7x-18}}{x^2-5x-14}$

$x^2-7x-18 = 0$   
 $(x-9)(x+2) = 0$   
 $x = 9, -2$   
 $x^2-5x-14 = 0$   
 $(x-7)(x+2) = 0$   
 $x \neq 7, -2$   
 D: (-∞, -2) ∪ [9, ∞)



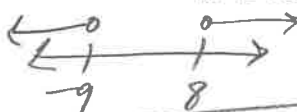
22.)  $f(x) = \sqrt{25-5x}$

$25-5x \geq 0$   
 $25 \geq 5x$   
 $x \leq 5$   
 D: (-∞, 5]



24.)  $f(x) = \frac{x+9}{\sqrt{x^2+x-72}}$

$x^2+x-72 = 0$   
 $(x+9)(x-8) = 0$   
 $x = -9, 8$   
 D: (-∞, -9) ∪ (8, ∞)

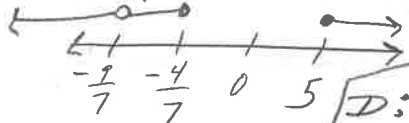


Polynomial! 😊

D: (-∞, ∞)

25.)  $f(x) = \frac{\sqrt{7x^2-31x-20}}{7x^2+9x}$

$7x^2-31x-20 = 0$   
 $7x(x-5) + 4(x-5) = 0$   
 $(7x+4)(x-5) = 0$   
 $x = -\frac{4}{7}, 5$   
 $7x^2+9x = 0$   
 $x(7x+9) = 0$   
 $x \neq 0, -\frac{9}{7}$   
 D: (-∞, -\frac{9}{7}) ∪ (-\frac{9}{7}, -\frac{4}{7}) ∪ [5, ∞)



26.)  $f(x) = \sqrt{8x^2-48x}$

$8x^2-48x = 0$   
 $8x(x-6) = 0$   
 $x = 0, 6$   
 D: (-∞, 0] ∪ [6, ∞)

