

Name: \_\_\_\_\_

Period: \_\_\_\_\_

## 0.5 Simplifying, Multiplying and Dividing Rational Expressions

Directions: Find the domain for each expression.

1.  $d(y) = y + 3$

2.  $g(k) = 2k^2 + 4k - 6$

3.  $b(n) = \sqrt{2n - 8}$

4.  $m(t) = \sqrt{9 - 3t}$

5.  $u(x) = \frac{x - 5}{2x + 4}$

6.  $a(r) = r + \frac{1}{r - 1}$

7.  $q(w) = \frac{w + 4}{w^2 + 1}$

8.\*  $f(x) = \frac{x}{\sqrt{x + 3}}$

9.\*  $t(v) = \sqrt{v^2 + 2v - 8}$

1)  $x \in \mathbb{R}$

2)  $x \in \mathbb{R}$

3)  $2n - 8 \geq 0$   
 $2n \geq 8$   
 $n \geq 4$

4)  $9 - 3t \geq 0$   
 $9 \geq 3t$   
 $3 \geq t$

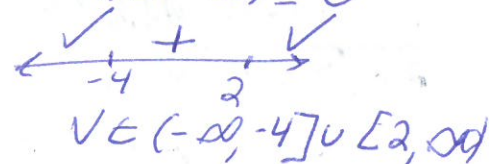
5)  $2x + 4 \neq 0$   
 $2x \neq -4$   
 $x \neq -2$

6)  $r - 1 \neq 0$   
 $r \neq 1$

7)  $w^2 + 1 \neq 0$   
 $\uparrow$   
Since  $w^2 \geq 0$ ,  
 $w \in \mathbb{R}$

8)  $x + 3 \geq 0$   
 $x \geq -3$

9)  $v^2 + 2v - 8 \geq 0$   
 $(v + 4)(v - 2) \geq 0$

  
 $v \in (-\infty, -4] \cup [2, \infty)$

Directions: Simplify and find the domain of each expression.

D:  $x \neq 0$   
10.  $\frac{18x^6}{27x^4} = \frac{2x^2}{3}$

D:  $x \neq 0$   
11.  $\frac{3x^2}{12x} = \frac{x}{4}$

12.  $\frac{10a^3b}{-15ab^3} = \frac{2a^2}{-3b^2}$

D:  $x \neq 0, -6$   
13.  $\frac{3x + 18}{x^2 + 6x} = \frac{3(x + 6)}{x(x + 6)}$   
 $\frac{3}{x}$

D:  $x \neq 4, 0$   
14.  $\frac{3x - 12}{3x^2 - 12x} = \frac{3(x - 4)}{3x(x - 4)} = \frac{1}{x}$

D:  $x \neq -5, 3$   
15.  $\frac{x^2 - 5x + 6}{x^2 + 2x - 15} = \frac{(x - 6)(x + 1)}{(x + 5)(x - 3)}$

16.  $D: X \neq -1, -3$

$$\frac{4x+4}{x^2+4x+3}$$

$$\frac{4(X+1)}{(X+1)(X+3)}$$

$$\frac{4}{X+3}$$

17.  $D: X \neq 4, -2$

$$\frac{x^2-x-12}{x^2-2x-8}$$

$$\frac{(X-4)(X+3)}{(X-4)(X+2)}$$

$$\frac{X+3}{X+2}$$

18.  $X \neq 0, 4$

~~$D: X \neq 0, 4$~~

$$\frac{x^2-5x+4}{x^2-4x}$$

$$\frac{(X-1)(X-4)}{X(X-4)}$$

$$\frac{X-1}{X}$$

19.  $D: X \neq 9, -4, -10$

$$\frac{x^2-16}{9-x} \cdot \frac{x^2+x-90}{x^2+14x+40}$$

$$\frac{(X-4)(X+4)(X+10)(X-9)}{-(X-9)(X+10)(X+4)}$$

20.  $D: X \neq 0, 2, -5$

$$\frac{10x^2-20x}{40x^3-80x^2} \cdot \frac{16x^3+80x^2}{6x+30}$$

$$\frac{10x(X-2) \cancel{16x^2}(X+5) 8}{40x^2(X-2) 6(X+5) 3}$$

$$\frac{8X}{3}$$

21.  $D: n \neq 4/7, 7/2$

$$\frac{4n^3-14n^2}{14n^3-8n^2} \div \frac{8n-28}{28-49n}$$

$$\frac{2n^2(2n-7) \cancel{14n^2} 7(4-7n)}{2n^2(7n-4) 4(2n-7)}$$

$$\frac{7(4-7n)}{4(7n-4)} \rightarrow \frac{-7(7n/4)}{4(7n-4)}$$

$$-7/4$$

22.  $D: b \neq -5/7, -7$

$$\frac{14b+10}{7b+5} \div \frac{3b^2+13b-56}{48-18b}$$

$$\frac{2(7b+5)}{7b+5} \cdot \frac{6(8-3b)(-1)}{(3b-8)(b+7)}$$

$$\frac{-12}{b+7}$$

23. Find the domain of the expression.

$$\frac{x-3}{2+x^4}$$

$X \in \mathbb{R}$   
Since  $x^4 \geq 0$

24. Find the domain of the expression.

$$\frac{4+x}{\sqrt{4+x}}$$

$4+x \geq 0$   
 $D: X \geq -4$

25. Simplify and find the domain.  $D: X \neq -2$

$$\frac{3x^4-48}{3x^2+12x+12}$$

$$= \frac{3(x^4-16)}{3(x^2+4x+4)}$$

$$\frac{(x^2-4)(x^2+4)}{(x+2)(x+2)} = \frac{(x-2)(x+4)}{x+2}$$

26. Simplify and find the domain.  $D: X \in \mathbb{R}$

$$\frac{2x^2+6x^3+5x^7+15x^8}{3x^2+8x+7=0}$$

Can't be factored  
No sol.

$$x^2(2+6x+5x^5+15x^6)$$

$$x^2(2(1+3x)+5x^5(1+3x))$$

$$x^2(2+5x^5)(1+3x)$$

Can't be simplified