

**2.1 Domain (Allowed X-Values) and Simplifying Rational Expressions**

Name \_\_\_\_\_

Determine the domain of each rational expression.	
1. $\frac{3+x}{x-4}$	2. $\frac{x+1}{x+2}$
3. $\frac{x^2-6}{x}$	4. $\frac{x^2-9}{2x}$
5. $\frac{4x-7}{x^2+5}$	6. $\frac{3x-1}{2x^2+2}$
7. $\frac{3x-1}{x^2-7x}$	8. $\frac{x^2-1}{x^2+6x}$
Answers: 1. $\{x \in \mathbb{R} \mid x \neq 4\}$ ; 3. $\{x \in \mathbb{R} \mid x \neq 0\}$ ; 5. $\{x \in \mathbb{R}\}$ ; 7. $\{x \in \mathbb{R} \mid x \neq 0, 7\}$	

Determine the domain of each rational expression.

9.  $\frac{x^2 + 3x - 10}{x^2 + 7x + 10}$

10.  $\frac{x - 5}{x^2 - 3x - 28}$

11.  $\frac{5}{x^2 - 9}$

12.  $\frac{x}{x^2 - 16}$

13.  $\frac{x^2 + 7x + 6}{6}$

14.  $\frac{x^2 + 3x + 2}{10}$

Answers: 9.  $\{x \in \mathbb{R} \mid x \neq -2, -5\}$ ; 11.  $\{x \in \mathbb{R} \mid x \neq -3, 3\}$ ; 13.  $\{x \in \mathbb{R}\}$

Simplify completely.

15.  $\frac{18x^3y^4}{6x^5y^3}$

16.  $\frac{5ab^3}{25a^2b^2}$

17.  $\frac{5x-10}{45x}$

18.  $\frac{21y^2-35y}{-7y}$

19.  $\frac{3x-21}{6x-42}$

20.  $\frac{4x+8}{7x+14}$

21.  $\frac{2x-6}{3x^2-x^3}$

22.  $\frac{4r-2}{2-4r}$

Answers: 15.  $\frac{3y}{x^2}$ ; 17.  $\frac{x-2}{9x}$ ; 19.  $\frac{1}{2}$ ; 21.  $-\frac{2}{x^2}$

Simplify completely.

23.  $\frac{x^2 - 7x + 12}{x^2 - 2x - 8}$

24.  $\frac{x^2 + 9x + 20}{x^2 - x - 30}$

25.  $\frac{2x^2 + 3x - 9}{2x^2 - 13x + 15}$

26.  $\frac{2x^2 - 15x - 8}{4x^2 - 8x - 5}$

Answers: 23.  $\frac{x-3}{x+2}$ ; 25.  $\frac{x+3}{x-5}$

Simplify completely.

27.  $\frac{4x^2 - 24x}{36 - x^2}$

28.  $\frac{x^2 - 5x}{25 - x^2}$

29.  $\frac{x^2 - 1}{x^3 - 1}$

30.  $\frac{x + 1}{x^3 + 1}$

Answers: 27.  $-\frac{4x}{x + 6}$ ; 29.  $\frac{x + 1}{x^2 + x + 1}$

Complete the blank to make an equivalent rational expression.

31.

$$5x = \frac{\quad}{2y^2}$$

32.

$$2xy = \frac{\quad}{3x}$$

33.

$$\frac{4}{b} = \frac{\quad}{12ab}$$

34.

$$\frac{2}{3b} = \frac{\quad}{6b^2}$$

35.

$$\frac{2}{x+5} = \frac{\quad}{3x+15}$$

36.

$$\frac{1}{2x-1} = \frac{\quad}{8x-4}$$

37.

$$\frac{3}{1-x} = \frac{\quad}{x-1}$$

38.

$$\frac{2}{3-x} = \frac{\quad}{x-3}$$

39.

$$\frac{2x+3}{x-6} = \frac{\quad}{x^2-7x+6}$$

40.

$$\frac{x-3}{x+2} = \frac{\quad}{x^2+7x+10}$$

Answers: 31.  $10xy^2$ ; 33.  $48a$ ; 35. 6; 37.  $-3$ ; 39.  $(2x+3)(x-1)$ ;