

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. $(2x+3)(x-1)$;