

# Chapter 6 Test

## Multiple Choice

For #1 to #7, select the best answer.

1. What are the non-permissible values of  $c$  for

the rational expression  $\frac{c^2 + 6c + 8}{c^2 - 5c - 14}$ ?

- A  $-7, 2$   
 B  $-2, -4$   
 C  $7$   
 D  $7, -2$

2. Simplify the rational expression

$$\frac{5(a-7)(b+2)^2}{20a(7-a)(b+2)}$$

- A  $\frac{2+b}{4}$   
 B  $\frac{-b-2}{4}$   
 C  $\frac{b+2}{4a}$   
 D  $\frac{2+b}{-4a}$

3. Valerie wants to write an expression equivalent to  $\frac{b+1}{2b}$  with a denominator of  $6b(2b-3)$ . By what expression must she multiply the original expression?

- A  $\frac{1}{3b(2b-3)}$   
 B  $\frac{3(2b-3)}{3(2b-3)}$   
 C  $\frac{(2b-3)}{(2b-3)}$   
 D  $3(2b-3)$

4. State the least common denominator of

$$\frac{6}{2a} \text{ and } \frac{4}{2a(a-1)}$$

- A  $(a-1)$       B  $a(a-1)$   
 C  $2a$       D  $2a + (2a)(a-1)$

5. In simplest form, the expression

$$\frac{12x^5 + 6x^4 - 8x^3}{2x^3} - \frac{6x^4 + 15x^3 - 9x^2}{3x^2}$$

can be expressed as

- A  $4x^2 - 2x - 7$   
 B  $4x^2 - 2x - 1$   
 C  $4x^2 + 2x - 7$   
 D  $4x^2 - 2x + 7$

6. What is the solution to the equation

$$x + \frac{x^2 - 5}{x^2 - 1} = \frac{x^2 + x + 2}{x + 1}$$

- A  $x = -1$   
 B  $x = 0, 3$   
 C  $x = 3$   
 D  $x = 3, -1$

7. What is the simplified form of the

$$\text{expression } \frac{9x+5}{x+6} - \frac{2x-1}{x+6}, \quad x \neq -6?$$

- A  $7x + 6$       B  $\frac{7x+4}{x+6}$   
 C  $\frac{7x+2}{x+3}$       D  $\frac{7x+6}{x+6}$

## Short Answer

8. Simplify  $\frac{x^2 - 9}{2x^2 + 3x - 9}$ . State any non-permissible values.

9. Determine the sum of  $\frac{4x}{x^2 - 9x + 18}$  and  $\frac{2x-1}{x-6}$  in simplest form.

10. The rational expressions  $\frac{x^2 + 13x + 40}{x^2 - 13x + 40}$

and  $\frac{64 + x^2}{64 - x^2}$  have one integral

non-permissible value in common. What is this non-permissible value?



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(continued)

11. Identify which one of the following four expressions does not belong with the other three. Explain your reasoning.

$$\frac{1}{x+3} \quad \frac{x^2+5x+6}{x-5}$$

$$\frac{x-1}{\sqrt{x+3}} \quad \frac{x^2}{3}$$

12. Consider the rational expression

$$\frac{x^2-x-20}{x^2-6x} \div \frac{x^2+9x+20}{x^2-12x+36}$$

- Determine the non-permissible values.
  - Determine the quotient in simplest form.
13. Jacob is a junior member of a local golf driving range. He pays \$15 per month to use the range, and pays \$1 per bucket of balls.
- If Jacob hits  $x$  buckets of balls in one month, write an expression that represents how much he would pay per month.
  - Write an expression that represents the actual cost per bucket for a month.
  - Write and solve an equation to determine the number of buckets of balls Jacob would have to hit in a month for the actual cost per bucket to be \$1.25.

**Extended Response**

14. Ryan states, "An expression and its simplest form do not always have the same restrictions." Do you agree with Ryan? Use the expression  $\frac{-6m^3np}{-3m^2np^2}$  as an example to justify your response.

15. Mary simplified the expression  $\frac{15y^2-3y}{3y}$

by cancelling common terms in the numerator and the denominator. Her work is shown. Identify and correct Mary's error. Explain your reasoning.

$$\begin{aligned} \frac{15y^2-3y}{3y} &= \frac{15y^2-3y}{3y} \\ &= \frac{15y^2-1}{1} \\ &= 15y^2-1 \end{aligned}$$

Verify:

Let  $y = 1$ .

$$\begin{aligned} \frac{15(1)^2-3(1)}{3(1)} &= 15(1)^2-1 \\ \frac{15-3}{3} &= 15-1 \\ 4 &\neq 14 \end{aligned}$$

16. Determine the solution for the equation  $\frac{2a+1}{3} + 2 = \frac{5}{a} - \frac{1-4a}{6}$ . Explain the process you used to solve the equation.
17. Consider the following rational equation:
- $$\frac{3x}{x+1} + \frac{2}{x+2} - \frac{3x}{x+3} = \frac{-2}{(x+1)(x+2)(x+3)}$$
- List the non-permissible values for  $x$ .
  - Determine the roots of the equation algebraically.
  - Is each of the roots a solution to the equation? Explain.
  - What is the solution to the given equation?

