

Rational Functions Practice Test: Chapter 9**Multiple Choice***Identify the choice that best completes the statement or answers the question.*

- _____ 1. Suppose that x and y vary inversely, and $x = 2$ when $y = 7$. Write the function that models the inverse variation.

a. $y = \frac{9}{x}$

c. $y = \frac{5}{x}$

b. $y = 3.5x$

d. $y = \frac{14}{x}$

Is the relationship between the variables in the table a direct variation, an inverse variation, or neither? If it is a direct or inverse variation, write a function to model it.

- _____ 2.

x	-4	-1	2	5
y	36	9	-18	-45

a. direct variation; $y = -9x$

b. inverse variation; $y = \frac{-144}{x}$

c. neither

- _____ 3.

x	8	11	15	20
y	22	28	36	46

a. direct variation; $y = \frac{11}{4}x$

b. inverse variation; $y = \frac{176}{x}$

c. neither

- _____ 4. Suppose that y varies directly with x and inversely with z , and $y = 45$ when $x = 40$ and $z = 8$. Write the equation that models the relationship. Then find y when $x = 12$ and $z = 4$.

a. $y = \frac{8x}{z}; 24$

c. $y = \frac{9z}{x}; 3$

b. $y = \frac{8z}{x}; \frac{8}{3}$

d. $y = \frac{9x}{z}; 27$

Find any points of discontinuity for the rational function.

_____ 5. $y = \frac{x - 5}{x^2 + 9x + 18}$

a. $x = -3, x = 6$

b. $x = 5$

c. $x = 3, x = 6$

d. $x = -3, x = -6$

_____ 6. $y = \frac{(x - 6)(x - 7)(x + 6)}{(x + 5)(x + 1)}$

a. $x = 6, x = 7, x = -6$

b. $x = 5, x = 1$

c. $x = -5, x = -1$

d. $x = -6, x = -7, x = 6$

_____ 7. Describe the vertical asymptote(s) and hole(s) for the graph of $y = \frac{(x + 3)(x - 3)}{(x - 3)(x - 2)}$.

a. asymptote: $x = -2$ and hole: $x = -3$

b. asymptote: $x = 2$ and hole: $x = 3$

c. asymptotes: $x = 2$ and $x = 3$

d. asymptote: $x = 3$ and hole: $x = 2$

_____ 8. Find the horizontal asymptote of the graph of $y = \frac{2x^5 - 8x + 8}{9x^2 + 5x + 8}$.

a. $y = \frac{5}{2}$

b. $y = \frac{2}{9}$

c. no horizontal asymptote

d. $y = 0$

Simplify the rational expression. State any restrictions on the variable.

_____ 9. $\frac{p^2 + 9p + 18}{p^2 + 4p + 3}$

a. $\frac{-(p + 6)}{p + 1}; p \neq -1$

b. $\frac{p + 6}{p + 1}; p \neq -3, p \neq -1$

c. $\frac{-(p + 6)}{p + 1}; p \neq -3, p \neq -1$

d. $\frac{p + 6}{p + 1}; p \neq -3, p \neq 1$

_____ 10. $\frac{c^2 - c - 12}{c + 3}$

a. $c + 4; c \neq 3$

b. $-c - 4; c \neq 3$

c. $c - 4; c \neq -3$

d. $-c + 4; c \neq -3$

Multiply or divide. State any restrictions on the variables.

_____ 11. $\frac{b^2}{b+4} \cdot \frac{b^2+2b-8}{b^2-4b}$

a. $\frac{b-2}{b-4}, b \neq -4, 4$

b. $\frac{b^2-2b}{b-4}, b \neq -4, 4$

c. $\frac{b^2-2b}{b-4}, b \neq -4, 0, 4$

d. $\frac{b-2}{b-4}, b \neq -4, 0, 4$

_____ 12. $\frac{t-2}{t+4} \div \frac{t-6}{t^2-t-20}$

a. $\frac{(t-2)(t-5)}{t-6}, t \neq -4, 6$

b. $\frac{(t-2)(t-6)}{(t+4)^2(t-5)}, t \neq -4, 5$

c. $\frac{(t-2)(t-6)}{(t+4)^2(t-5)}, t \neq -4, 5, 6$

d. $\frac{(t-2)(t-5)}{t-6}, t \neq 5, 6$

Add or subtract. Simplify if possible.

_____ 13. $\frac{a^2+a-12}{a^2-4a+3} + \frac{2}{a-1}$

a. $a+6$

b. $\frac{a+4}{a-1}$

c. $\frac{a+6}{a-1}$

d. $\frac{a^2+a-10}{a^2-4a+3}$

_____ 14. $\frac{2}{g+10} + \frac{2}{g^2-100}$

a. $\frac{2g-18}{(g-10)(g+10)}$

b. $\frac{2g+22}{(g-10)(g+10)}$

c. $\frac{4}{g^2+g-90}$

d. $\frac{4}{(g-10)(g+10)}$

_____ 15. $\frac{z^2-2z-24}{z^2-3z-18} - \frac{6}{z+3}$

a. $z-2$

b. $\frac{z+4}{z+3}$

c. $\frac{z-2}{z+3}$

d. $\frac{z^2-2z-30}{z^2-3z-18}$

Simplify the complex fraction.

_____ 16. $\frac{\frac{4}{2y} - \frac{1}{2y}}{\frac{4}{2y} + \frac{3}{y}}$

a. $\frac{9}{28}$

b. $\frac{3}{10}$

c. $\frac{10}{3}$

d. $\frac{28}{9}$

_____ 17. $\frac{x + \frac{4x}{y}}{\frac{7}{3x}}$

a. $\frac{15x^2}{7y}$

b. $\frac{7x(y+4)}{3xy}$

c. $\frac{3x^2(y+4)}{7y}$

d. $\frac{3(y+4)}{7y}$

Solve the equation. Check the solution.

_____ 18. $\frac{-4}{x-5} = \frac{-1}{x+1}$

a. $-\frac{9}{4}$

b. -3

c. $-\frac{4}{3}$

d. $-\frac{5}{3}$

_____ 19. $\frac{6}{x^2-9} - \frac{1}{x-3} = 1$

a. -4

b. 2

c. $\frac{-1 \pm \sqrt{73}}{2}$

d. 3 or -4

_____ 20. $\frac{3}{5p} + \frac{3}{5p} = -6$

a. $-\frac{1}{3}$

b. $\frac{6}{5}$

c. $-\frac{1}{5}$

d. $-\frac{1}{10}$

_____ 21. $\frac{q+9}{q+3} = \frac{q+7}{q+4}$

a. 19

b. $-\frac{19}{3}$

c. -5

d. $\frac{19}{3}$

_____ 22. Suppose that x and y vary inversely, and $x = 7$ when $y = 11$. Write the function that models the inverse variation.

a. $y = 1.57x$

c. $y = \frac{77}{x}$

b. $y = \frac{18}{x}$

d. $y = \frac{4}{x}$

_____ 23. Find the horizontal asymptote of the graph of $y = \frac{8x^4 - 4x + 4}{-9x^2 + x + 4}$.

a. $y = -\frac{8}{9}$

c. $y = 0$

b. no horizontal asymptote

d. $y = 2$

Describe the combined variation that is modeled by the formula or equation.

_____ 24. $y = \frac{w}{2x^2}$

a. y varies directly as w and inversely as x .b. y varies directly as w and inversely as the square of $2x$.c. y varies directly as the square of x and inversely as w .d. y varies directly as w and inversely as the square of x .

Rational Functions Practice Test: Chapter 9

Answer Section

MULTIPLE CHOICE

1. ANS: D PTS: 1 DIF: L2 REF: 9-1 Inverse Variation
OBJ: 9-1.1 Using Inverse Variation TOP: 9-1 Example 1
KEY: rational function | inverse variation
2. ANS: A PTS: 1 DIF: L2 REF: 9-1 Inverse Variation
OBJ: 9-1.1 Using Inverse Variation TOP: 9-1 Example 2
KEY: rational function | direct variation
3. ANS: C PTS: 1 DIF: L2 REF: 9-1 Inverse Variation
OBJ: 9-1.1 Using Inverse Variation TOP: 9-1 Example 2
KEY: rational function | no variation
4. ANS: D PTS: 1 DIF: L2 REF: 9-1 Inverse Variation
OBJ: 9-1.2 Using Combined Variation TOP: 9-1 Example 5
KEY: direct variation | combined variation
5. ANS: D PTS: 1 DIF: L2
REF: 9-3 Rational Functions and Their Graphs
OBJ: 9-3.1 Properties of Rational Functions TOP: 9-3 Example 1
KEY: rational function | point of discontinuity
6. ANS: C PTS: 1 DIF: L2
REF: 9-3 Rational Functions and Their Graphs
OBJ: 9-3.1 Properties of Rational Functions TOP: 9-3 Example 1
KEY: rational function | point of discontinuity
7. ANS: B PTS: 1 DIF: L2
REF: 9-3 Rational Functions and Their Graphs
OBJ: 9-3.1 Properties of Rational Functions TOP: 9-3 Example 2
KEY: asymptote | vertical asymptote | rational function | graphing | hole in the graph of a function
8. ANS: C PTS: 1 DIF: L2
REF: 9-3 Rational Functions and Their Graphs
OBJ: 9-3.1 Properties of Rational Functions TOP: 9-3 Example 3
KEY: asymptote | graphing | rational function | horizontal asymptote
9. ANS: B PTS: 1 DIF: L2 REF: 9-4 Rational Expressions
OBJ: 9-4.1 Simplifying Rational Expressions STA: CA A2 7.0
TOP: 9-4 Example 1
KEY: rational expression | simplifying a rational expression | restrictions on a variable
10. ANS: C PTS: 1 DIF: L2 REF: 9-4 Rational Expressions
OBJ: 9-4.1 Simplifying Rational Expressions STA: CA A2 7.0
TOP: 9-4 Example 1
KEY: rational expression | simplifying a rational expression | restrictions on a variable
11. ANS: C PTS: 1 DIF: L2 REF: 9-4 Rational Expressions
OBJ: 9-4.2 Multiplying and Dividing Rational Expressions STA: CA A2 7.0
TOP: 9-4 Example 3
KEY: simplifying a rational expression | restrictions on a variable | multiplying rational expressions

12. ANS: A PTS: 1 DIF: L2 REF: 9-4 Rational Expressions
 OBJ: 9-4.2 Multiplying and Dividing Rational Expressions STA: CA A2 7.0
 TOP: 9-4 Example 4 KEY: restrictions on a variable | dividing rational expressions
13. ANS: C PTS: 1 DIF: L2
 REF: 9-5 Adding and Subtracting Rational Expressions
 OBJ: 9-5.1 Adding and Subtracting Rational Expressions STA: CA A2 7.0
 TOP: 9-5 Example 3
 KEY: simplifying a rational expression | adding rational expressions
14. ANS: A PTS: 1 DIF: L2
 REF: 9-5 Adding and Subtracting Rational Expressions
 OBJ: 9-5.1 Adding and Subtracting Rational Expressions STA: CA A2 7.0
 TOP: 9-5 Example 3
 KEY: simplifying a rational expression | adding rational expressions
15. ANS: C PTS: 1 DIF: L2
 REF: 9-5 Adding and Subtracting Rational Expressions
 OBJ: 9-5.1 Adding and Subtracting Rational Expressions STA: CA A2 7.0
 TOP: 9-5 Example 4
 KEY: simplifying a rational expression | subtracting rational expressions
16. ANS: B PTS: 1 DIF: L2
 REF: 9-5 Adding and Subtracting Rational Expressions
 OBJ: 9-5.2 Simplifying Complex Fractions STA: CA A2 7.0
 TOP: 9-5 Example 5
 KEY: complex fraction | simplifying a rational expression | simplifying a complex fraction
17. ANS: C PTS: 1 DIF: L2
 REF: 9-5 Adding and Subtracting Rational Expressions
 OBJ: 9-5.2 Simplifying Complex Fractions STA: CA A2 7.0
 TOP: 9-5 Example 5 KEY: complex fraction | simplifying a rational expression
18. ANS: B PTS: 1 DIF: L2 REF: 9-6 Solving Rational Equations
 OBJ: 9-6.1 Solving Rational Equations STA: CA A2 7.0 TOP: 9-6 Example 1
 KEY: rational equation
19. ANS: A PTS: 1 DIF: L2 REF: 9-6 Solving Rational Equations
 OBJ: 9-6.1 Solving Rational Equations STA: CA A2 7.0 TOP: 9-6 Example 2
 KEY: rational equation | no solutions
20. ANS: C PTS: 1 DIF: L2 REF: 9-6 Solving Rational Equations
 OBJ: 9-6.1 Solving Rational Equations STA: CA A2 7.0 TOP: 9-6 Example 2
 KEY: rational equation
21. ANS: C PTS: 1 DIF: L2 REF: 9-6 Solving Rational Equations
 OBJ: 9-6.1 Solving Rational Equations STA: CA A2 7.0 TOP: 9-6 Example 1
 KEY: rational equation
22. ANS: C PTS: 1 DIF: L2 REF: 9-1 Inverse Variation
 OBJ: 9-1.1 Using Inverse Variation TOP: 9-1 Example 1
 KEY: rational function | inverse variation
23. ANS: B PTS: 1 DIF: L2
 REF: 9-3 Rational Functions and Their Graphs
 OBJ: 9-3.1 Properties of Rational Functions TOP: 9-3 Example 3
 KEY: asymptote | graphing | rational function | horizontal asymptote

24. ANS: D PTS: 1 DIF: L3 REF: 9-1 Inverse Variation
OBJ: 9-1.2 Using Combined Variation TOP: 9-1 Example 4
KEY: direct variation | inverse variation | combined variation