

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Find the numerical value of the expression for the given value of x .

1) $\frac{4x - 6}{9x^2 + 2x + 4}$, $x = -4$ 1) _____
 A) $-\frac{11}{74}$ B) $-\frac{11}{70}$ C) $\frac{1}{14}$ D) $-\frac{1}{14}$

Find all values that make the expression undefined.

2) $\frac{r - 3}{4}$ 2) _____
 A) -3 B) None C) 3 D) 0

3) $\frac{5}{2z}$ 3) _____
 A) 0.5 B) 0 C) 2 D) None

Write the expression in lowest terms.

4) $\frac{a^2 - 9a}{(a + 7)(a - 9)}$ 4) _____
 A) $\frac{1}{a + 7}$ B) $\frac{a - 9}{a + 7}$ C) $\frac{a^2}{a + 7}$ D) $\frac{a}{a + 7}$

5) $\frac{a^2 - 36}{a^2 + 9a + 18}$ 5) _____
 A) $\frac{a - 6}{a + 3}$ B) $\frac{a + 6}{a + 3}$ C) $\frac{a + 6}{a - 3}$ D) $\frac{a - 6}{a - 3}$

6) $\frac{a^2 - b^2 - 5a + 5b}{4a + 4b - 20}$ 6) _____
 A) $\frac{b - a}{4}$ B) $\frac{a + b}{20}$ C) $\frac{a - b}{4}$ D) $\frac{a^2 - b^2}{20}$

7) $\frac{m^2 - 16m}{16 - m}$ 7) _____
 A) -m B) m C) $m + 4$ D) $-(m + 4)$

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Answer the question.

8) If 8 is substituted for x in the rational expression $\frac{x - 8}{x^6 - 262,144}$, the result is $\frac{0}{0}$. 8) _____

Mathematicians have been known to say "Any number divided by itself is 1." Does this mean that this expression is equal to 1 for $x = 8$? Explain why or why not.

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Find the reciprocal.

9) $\frac{(x-y)^2}{x}$

9) _____

A) $1 - \frac{x}{y}$

B) $\frac{x}{(x-y)^2}$

C) $\frac{x}{(x-y)}$

D) $\frac{1}{y^2}$

Perform the indicated operation. Write the answer in lowest terms.

10) $\frac{b^3 - 125a^3}{25a^3 + 10a^2b + ab^2} \div \frac{25a^2 + 5ab + b^2}{-a^3 - ab^3}$

10) _____

A) $\frac{-(b-5a)(a^2+b^3)}{(5a+b)^2}$

B) $\frac{b^3 - a^2}{5a + b}$

C) $\frac{-a^2 - b^3}{5a + b}$

D) $\frac{-(b-5a)}{(5a+b)^2(a^2+b^3)}$

Answer the question.

11) If the rational expression $\frac{8x^9y^6}{3p^9q}$ represents the area of a rectangle and $\frac{3x^8y^4}{p^8}$ represents the length of the rectangle, what rational expression represents the width?

11) _____

A) $\frac{8x^5y^8}{9p^{11}q}$

B) $\frac{8xy^2}{6pq}$

C) $\frac{8x^5y^8}{p^{11}q}$

D) $\frac{8xy^2}{9pq}$

Find the least common denominator (LCD).

12) $\frac{3}{m^2 + 4m}, \frac{4}{m^2 + 2m - 8}$

12) _____

A) $(m+6)^2$

B) $m(m+6)(m-2)$

C) $m(m+4)(m-2)$

D) $m(m+6)^2$

13) $\frac{4}{x^2 + 7x + 6}, \frac{7}{4x + 24}$

13) _____

A) $4(x+1)(x+6)$

B) $4(x+1)(x-6)$

C) $4(x-1)(x+6)$

D) $4(x-1)(x-6)$

Rewrite the expression with the indicated denominator.

14) $\frac{-16(x-7)}{x(x+2)} = \frac{\quad}{x^3 - 2x^2 - 8x}$

14) _____

A) $\frac{(x-7)(x-4)}{x^3 - 2x^2 - 8x}$

B) $\frac{-16(x-4)}{x^3 - 2x^2 - 8x}$

C) $\frac{-16(x-7)(x-4)}{x^3 - 2x^2 - 8x}$

D) $\frac{-16(x-7)(x+4)}{x^3 - 2x^2 - 8x}$

Perform the indicated operation and simplify.

15) $\frac{19}{q-7} - \frac{6}{q-7}$

15) _____

A) $\frac{13}{q}$

B) $\frac{13}{q-7}$

C) $\frac{19(q-7)}{6(q-7)}$

D) $\frac{25}{q-7}$

Perform the indicated operation.

16) $\frac{10x}{x^2 - 100} - \frac{7}{10 - x}$

16) _____

A) $\frac{17x + 70}{x^2 - 100}$

B) $\frac{3x - 70}{x^2 - 100}$

C) $\frac{17x - 70}{x^2 - 100}$

D) $\frac{10x - 7}{x^2 - 100}$

17) $\frac{8}{7x - 9} - \frac{6}{9 - 7x}$

17) _____

A) $\frac{-14}{7x - 9}$

B) $\frac{-2}{7x - 9}$

C) $\frac{14}{7x - 9}$

D) $\frac{2}{7x - 9}$

Perform the indicated operation and simplify.

18) $\frac{4m}{m - 5} + \frac{7 + m}{m} - \frac{1}{m^2 - 5m}$

18) _____

A) $\frac{m^2 + 2m - 36}{m^2 - 5m}$

B) $\frac{5m^2 + 2m - 36}{m^2 - m}$

C) $\frac{5m^2 + 2m - 36}{m^2 - 5m}$

D) $\frac{5m^2 + 7m - 36}{m^2 - 5m}$

Perform the indicated operation and simplify.

19) $\frac{4}{x + 6} + \frac{2}{x}$

19) _____

A) $\frac{6x + 12}{x}$

B) $\frac{6x + 12}{(x + 6)}$

C) $\frac{4x + 12}{x(x + 6)}$

D) $\frac{6x + 12}{x(x + 6)}$

20) $\frac{5}{r} + \frac{5}{r - 8}$

20) _____

A) $\frac{10r - 40}{r(r - 8)}$

B) $\frac{40r - 10}{r(8 - r)}$

C) $\frac{10r - 40}{r(8 - r)}$

D) $\frac{40r - 10}{r(r - 8)}$

Perform the indicated operation and simplify.

21) $\frac{20}{18x} - \frac{7}{18x}$

21) _____

A) $\frac{13}{36x}$

B) $\frac{18x}{13}$

C) 13

D) $\frac{13}{18x}$

Rewrite the expression with the indicated denominator.

22) $\frac{-1}{9m} = \frac{\quad}{54m}$

22) _____

A) $\frac{9}{54m}$

B) $\frac{6}{54m}$

C) $\frac{-1}{54m}$

D) $\frac{-6}{54m}$

Find the least common denominator (LCD).

23) $\frac{2}{10xy} + \frac{8}{25x^2}$

23) _____

A) $50xy^2$

B) $50x^2y$

C) $50x^3y$

D) $50xy^3$

24) $\frac{1}{20x} + \frac{1}{6y} + \frac{1}{30xy}$

24) _____

A) $12xy$

B) $60xy$

C) $20xy$

D) $30xy$

Perform the indicated operation. Write the answer in lowest terms.

25) $\left(\frac{x^2 - 4x - 21}{7x} \cdot \frac{x^2 - 7x}{x^2 - 14x + 49} \right) \div \frac{x + 3}{x + 7}$ 25) _____

A) $\frac{x + 3}{x}$ B) $\frac{x - 7}{x}$ C) $\frac{x + 7}{3}$ D) $\frac{x + 7}{7}$

Find the reciprocal.

26) $3x$ 26) _____

A) $-3x$ B) $\frac{x}{3}$ C) $\frac{3}{x}$ D) $\frac{1}{3x}$

Multiply. Write the answer in lowest terms.

27) $\frac{k^2 + 8k + 12}{k^2 + 10k + 16} \cdot \frac{k^2 + 15k + 56}{k^2 + 13k + 42}$ 27) _____

A) $\frac{k + 8}{k + 7}$ B) $\frac{1}{k + 7}$ C) 1 D) $\frac{k + 6}{k + 8}$

28) $\frac{2p - 2}{p} \cdot \frac{2p^2}{7p - 7}$ 28) _____

A) $\frac{4p^3 - 4p^2}{7p^2 - 7p}$ B) $\frac{7}{4p}$ C) $\frac{14p^2 + 28p + 14}{2p^3}$ D) $\frac{4p}{7}$

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Answer the question.

29) Why is $\frac{5x + 2}{x + 2}$ not equal to 5? 29) _____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Find an expression equivalent to the one given.

30) $\frac{-5k - 5}{12k + 3}$ 30) _____

A) $-\frac{5k - 5}{12k - 3}$ B) $-\frac{5k + 5}{12k + 3}$ C) $\frac{-5k + 5}{12k - 3}$ D) $\frac{5k - 5}{-12k + 3}$

31) $\frac{-3k + 6}{15k - 5}$ 31) _____

A) $\frac{-3k - 6}{15k + 5}$ B) $-\frac{3k - 6}{15k - 5}$ C) $-\frac{-3k + 6}{15k + 5}$ D) $\frac{3k + 6}{-15k - 5}$

Write the expression in lowest terms.

32) $\frac{x^2 - s^2}{s - x}$ 32) _____

A) $-x - s$ B) -1 C) $-x + s$ D) $x + s$

Perform the indicated operation and simplify.

$$33) \frac{3}{3r^2 - 5rs - 2s^2} - \frac{6}{6r^2 - 13rs + 2s^2} + \frac{7}{18r^2 + 3rs - s^2}$$

33) _____

A) $\frac{7r - 11s}{(3r + s)(r - 2s)(6r - s)}$

B) $\frac{43r - 23s}{(3r + s)(r - 2s)(6r - s)}$

C) $\frac{7r - 23s}{(3r + s)(r - 2s)(6r - s)}$

D) $\frac{43r - 11s}{(3r + s)(r - 2s)(6r - s)}$

$$34) \frac{5x - z}{5x^2 - 25xz + 3xz - 15z^2} - \frac{x + z}{x^2 - 25z^2}$$

34) _____

A) $\frac{16xz - 8z^2}{(x - 5z)^2(5x + 3z)}$

B) $\frac{16xz + 8z^2}{(x - 5z)(x + 5z)(5x + 3z)}$

C) $\frac{16xz - 8z^2}{(x - 5z)(x + 5z)(5x + 3z)}$

D) $\frac{10x^2 + 16xz - 2z^2}{(x - 5z)(x + 5z)(5x + 3z)}$

Answer the question.

35) If one form of the correct answer of a sum of two rational expressions is $\frac{7}{k - 9}$, what would be an alternate form of the answer if the denominator is $9 - k$?

35) _____

A) $\frac{-7}{k + 9}$

B) $\frac{7}{k - 9}$

C) $\frac{7}{k + 9}$

D) $\frac{-7}{9 - k}$

Simplify the complex fraction.

$$36) \frac{\frac{1}{k + 6}}{\frac{3}{k^2 - 36}}$$

36) _____

A) $\frac{k - 6}{3}$

B) $k - 6$

C) $\frac{k + 6}{3}$

D) $\frac{3}{k - 6}$

$$37) \frac{\frac{5}{3r - 1} - 5}{\frac{5}{3r - 1} + 5}$$

37) _____

A) $\frac{3r}{2 - 3r}$

B) $\frac{2 - 3r}{3r}$

C) $\frac{2 - r}{r}$

D) $\frac{2 + 3r}{3r}$

Answer the question.

38) Which of the following fractions is equivalent to $\frac{\frac{1}{2} + \frac{1}{4}}{\frac{1}{7} + \frac{1}{28}}$?

38) _____

A) $-\frac{5}{21}$

B) 28

C) $-\frac{21}{5}$

D) $\frac{21}{5}$

Identify as an equation or an expression.

39) $-7x + 5 = \frac{8x + 9}{7}$

39) _____

A) Expression

B) Equation

Solve the equation.

40) $\frac{x - 8}{6} = \frac{x + 2}{8}$

40) _____

A) {6}

B) $\left\{\frac{4}{3}\right\}$

C) $\left\{\frac{19}{12}\right\}$

D) {38}

41) $\frac{6}{m + 5} = 1 - \frac{1}{m - 5}$

41) _____

A) {0, 7}

B) {1, 5}

C) \emptyset

D) {0, -5}

Solve for the specified variable.

42) $S = \frac{a}{1 - r}$ for r

42) _____

A) $r = \frac{S - a}{S}$

B) $r = \frac{a}{S} - 1$

C) $r = \frac{a}{S}$

D) $r = S - a$

Answer the question.

43) List all numbers that must be rejected as possible solutions.

43) _____

$$\frac{17}{6x} - \frac{9}{16x} = \frac{x}{13}$$

A) { 6, 16 }

B) { 0 }

C) There are no numbers that must be rejected.

D) { 6, 16, 13 }

44) List all numbers that must be rejected as possible solutions.

44) _____

$$\frac{x + -5}{10} + \frac{17x + 12}{15} = \frac{x}{20}$$

A) There are no numbers which must be rejected.

B) { -10, -15, -20 }

C) { 10, 15, 20 }

D) { 10, 15, 20, 5, $-\frac{12}{17}$ }

Solve the problem.

45) In a certain fraction, the numerator is 4 less than the denominator. If 2 is added to both the numerator and the denominator, the resulting fraction is equal to $\frac{4}{8}$. Find the original fraction.

45) _____

A) $\frac{6}{10}$

B) $\frac{10}{6}$

C) $\frac{2}{6}$

D) $\frac{6}{2}$

- 46) The winner of the 1998 Peoria 500 (mile) race was Serge Bologna, with an average rate of 121.462 miles per hour. What was his time in hours? (Round to the nearest one thousandth hour.) 46) _____
 A) 60,731.000 hours B) -5.883 hours C) 14.117 hours D) 4.117 hours
- 47) A man rode a bicycle for 12 miles and then hiked an additional 8 miles. The total time for the trip was 5 hours. If his rate when he was riding a bicycle was 10 miles per hour faster than his rate walking, what was each rate? 47) _____
 A) Bike: 12 mph B) Bike: 13 mph C) Bike: 14.5 mph D) Bike: 11.5 mph
 Hike: 2 mph Hike: 3 mph Hike: 4.5 mph Hike: 1.5 mph
- 48) Two machines are turned on at 8:00 A.M. If one can produce 60 items each hour and the other can produce 37 items each hour, at what time will they produce a total of 776 items? 48) _____
 A) 5:30 P.M. B) 5:00 P.M. C) 3:00 P.M. D) 4:00 P.M.

Determine whether the statement represents direct or inverse variation.

- 49) The ability of a truck to climb hills increases as the weight of its cargo is reduced. 49) _____
 A) Direct B) Inverse

Solve the problem.

- 50) If s varies directly as t^2 , and $s = 512$ when $t = 8$, find s when t is 6. 50) _____
 A) $s = 48$ B) $s = 384$ C) $s = 64$ D) $s = 288$
- 51) The weight of a body above the surface of the earth is inversely proportional to the square of its distance from the water of the earth. What is the effect on the weight when the distance is multiplied by 2? 51) _____
 A) The weight is multiplied by 4. B) The weight is divided by 2.
 C) The weight is multiplied by 2. D) The weight is divided by 4.
- 52) According to Ohm's law, the electric current I , in amperes, in a circuit varies directly as the voltage V . When 28 volts are applied, the current is 4 amperes. What is the current when 7 volts are applied? 52) _____
 A) 1 amperes B) 39 amperes C) 49 amperes D) 7 amperes

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Provide an appropriate response.

- 53) Consider an equation of inverse variation $y = \frac{k}{x}$. When x increases, does y increase or decrease? 53) _____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Perform the indicated operation and simplify.

- 54) $\frac{7y^2}{y-1} + \frac{-7y}{y-1}$ 54) _____
 A) 0 B) $\frac{7y}{y-1}$ C) $7y$ D) $\frac{7y(y+1)}{y-1}$

Perform the indicated operation and simplify.

55) $\frac{3}{r} + \frac{8}{r-6}$

55) _____

A) $\frac{18r-11}{r(r-6)}$

B) $\frac{11r-18}{r(r-6)}$

C) $\frac{18r-11}{r(6-r)}$

D) $\frac{11r-18}{r(6-r)}$

Determine whether the statement represents direct or inverse variation.

56) $y = 8x^2$

56) _____

A) Inverse

B) Direct

Solve the problem.

57) An experienced accountant can prepare a tax return in 14 hours. A novice accountant can do the job in 22 hours. How long will it take them to do the job working together?

57) _____

A) $8\frac{5}{9}$ hr

B) $38\frac{1}{2}$ hr

C) $\frac{1}{36}$ hr

D) $\frac{1}{308}$ hr

58) A boat goes 240 miles downstream in the same time it can go 210 miles upstream. The speed of the current is 4 miles per hour. Find the speed of the boat in still water.

58) _____

A) 45 mph

B) 60 mph

C) 64 mph

D) 56 mph

59) A machine can fill 3370 boxes of cereal in 0.5 hour. How many boxes of cereal can it fill per hour?

59) _____

A) 5617 boxes/hour

B) 3371 boxes/hour

C) 1685 boxes/hour

D) 6740 boxes/hour

60) The sum of the reciprocals of two consecutive integers is $15/56$. Find the integers.

60) _____

A) 6 and 7

B) 7 and 8

C) 15 and 16

D) 8 and 9

Solve for the specified variable.

61) $P = \frac{A}{1+rt}$ for r

61) _____

A) $r = \frac{P-1}{At}$

B) $r = \frac{A-P}{Pt}$

C) $r = P - tA$

D) $r = \frac{P-A}{1+t}$

Solve the equation.

62) $\frac{-5x}{2x+2} = \frac{7x}{4x+4} + \frac{6x-4}{x+1}$

62) _____

A) $\left\{\frac{16}{41}\right\}$

B) $\left\{\frac{1}{41}\right\}$

C) $\{16\}$

D) $\left\{-\frac{16}{41}\right\}$

Identify as an equation or an expression.

63) $-9(6-x) + \frac{8x+6}{7}$

63) _____

A) Equation

B) Expression

Answer the question.

64) In a fraction, what operation does the fraction bar represent?

64) _____

A) Multiplication

B) Division

C) Addition

D) Subtraction

Answer Key

Testname: STUDY GUIDE 3-CH7

- 1) B
- 2) B
- 3) B
- 4) D
- 5) A
- 6) C
- 7) A
- 8) No. Explanations will vary.
- 9) B
- 10) A
- 11) D
- 12) C
- 13) A
- 14) C
- 15) B
- 16) A
- 17) C
- 18) C
- 19) D
- 20) A
- 21) D
- 22) D
- 23) B
- 24) B
- 25) D
- 26) D
- 27) C
- 28) D
- 29) Answers will vary.
- 30) B
- 31) B
- 32) A
- 33) C
- 34) C
- 35) D
- 36) A
- 37) B
- 38) D
- 39) B
- 40) D
- 41) A
- 42) A
- 43) B
- 44) A
- 45) C
- 46) D
- 47) A
- 48) D
- 49) B
- 50) D

Answer Key

Testname: STUDY GUIDE 3-CH7

- 51) D
- 52) A
- 53) y decreases.
- 54) C
- 55) B
- 56) B
- 57) A
- 58) B
- 59) D
- 60) B
- 61) B
- 62) A
- 63) B
- 64) B