

# MAT1033

## Review 3

Name \_\_\_\_\_

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

Perform the division.

$$1) \frac{-12x^4 + 24x^3 - 21x^2}{-3x^3}$$

1) \_\_\_\_\_

$$2) \frac{8x^2 + 16x - 12}{2x}$$

2) \_\_\_\_\_

Find the quotient using long division.

$$3) \frac{x^2 + 15x + 56}{x + 8}$$

3) \_\_\_\_\_

$$4) \frac{2m^2 + 6m - 20}{m + 5}$$

4) \_\_\_\_\_

$$5) \frac{x^2 - 36}{x + 6}$$

5) \_\_\_\_\_

$$6) \frac{x^2 - 100}{x - 10}$$

6) \_\_\_\_\_

Find the product and simplify.

$$7) \frac{s^2 - x^2}{s + x} \cdot \frac{s}{s^2 - sx}$$

7) \_\_\_\_\_

$$8) \frac{x^2 + 12x + 35}{x^2 + 14x + 45} \cdot \frac{x^2 + 9x}{x^2 + 5x - 14}$$

8) \_\_\_\_\_

Find the quotient and simplify.

$$9) \frac{(y-2)^2}{11} \div \frac{11y-22}{121}$$

9) \_\_\_\_\_

$$10) \frac{x+9}{-2-x} \div \frac{x^2-2x-63}{x^2-7x-18}$$

10) \_\_\_\_\_

$$11) \frac{z^2+5z+6}{z^2+10z+16} \div \frac{z^2+3z}{z^2+14z+48}$$

11) \_\_\_\_\_

Solve the equation.

$$12) \frac{x}{4} + \frac{9x}{5} = \frac{x}{20}$$

12) \_\_\_\_\_

$$13) \frac{5-a}{a} + \frac{3}{4} = \frac{7}{a}$$

13) \_\_\_\_\_

$$14) \frac{2}{t} = \frac{t}{5t-12}$$

14) \_\_\_\_\_

Solve the equation for the indicated variable.

$$15) P = \frac{A}{1+rt} \quad \text{for } r$$

15) \_\_\_\_\_

$$16) \frac{1}{a} + \frac{1}{b} = c \quad \text{for } a$$

16) \_\_\_\_\_

Solve the proportion.

$$17) \frac{2x+3}{x} = \frac{3}{2}$$

17) \_\_\_\_\_

$$18) \frac{x+6}{x} = \frac{12}{7}$$

18) \_\_\_\_\_

$$19) \frac{11}{12} = \frac{x-10}{x-4}$$

19) \_\_\_\_\_

**Solve.**

20) The ratio of the weight of an object on Earth to the weight of the same object on Pluto is 100 to 3. If a buffalo weighs 3677 pounds on Earth, find the buffalo's weight on Pluto. (Round to the nearest pound.)

20) \_\_\_\_\_

21) The ratio of a quarterback's completed passes to attempted passes is 7 to 10. If he attempted 40 passes, find how many passes he completed. Round to the nearest whole number if necessary.

21) \_\_\_\_\_

22) On an architect's blueprint, 1 inch corresponds to 6 feet. If an exterior wall is 30 feet long, find how long the blueprint measurement should be. Write answer as a mixed number if necessary.

22) \_\_\_\_\_

23) The scale on a map states that 1 centimeter corresponds to 50 kilometers. On the map, two cities are 17 cm apart. Find the actual distance.

23) \_\_\_\_\_

24) It is recommended that there be at least 19 square feet of work space for every person in a conference room. A certain conference room is 10 feet by 10 feet. Find the maximum number of people the room can accommodate.

24) \_\_\_\_\_

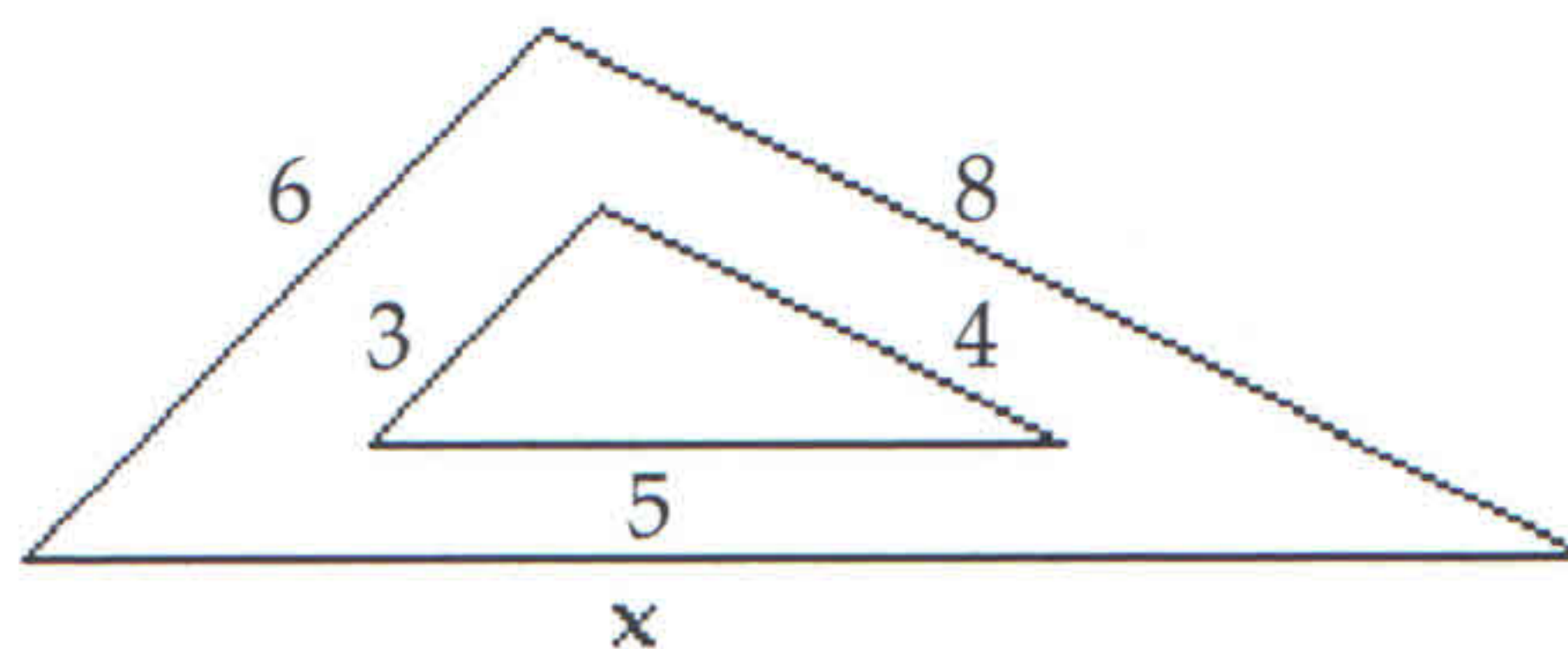
25) A punch recipe calls for mixing 3 parts of orange juice with 2 parts of apple juice. Find how much orange juice should be mixed with 42 ounces of apple juice.

25) \_\_\_\_\_

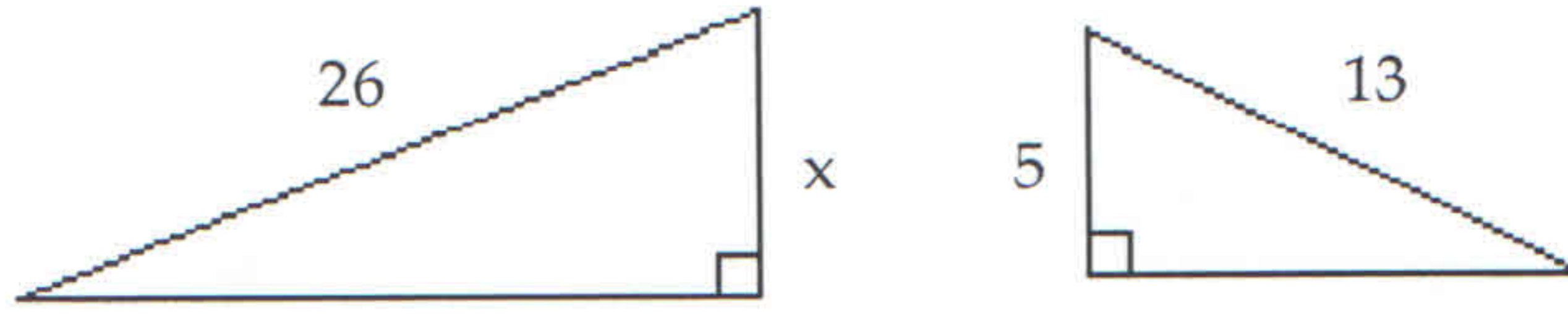
**Given that the pair of triangles is similar, find the missing length.**

26)

26) \_\_\_\_\_



27)



27) \_\_\_\_\_

**Solve.**

28) Two times the reciprocal of a number equals 28 times the reciprocal of 35. Find the number.

28) \_\_\_\_\_

29) Two times the reciprocal of a number equals 40 times the reciprocal of 50. Find the number.

29) \_\_\_\_\_

30) Two times the reciprocal of a number equals 32 times the reciprocal of 40. Find the number.

30) \_\_\_\_\_

31) Five divided by the difference of a number and 12 equals the quotient of 10 and the sum of the number and 7. Find the number.

31) \_\_\_\_\_

32) Five divided by the difference of a number and 6 equals the quotient of 10 and the sum of the number and 8. Find the number.

32) \_\_\_\_\_

33) If three times a number added to 3 is divided by the number plus 12, the result is four thirds. Find the number.

33) \_\_\_\_\_

34) If three times a number added to 5 is divided by the number plus 4, the result is four thirds. Find the number.

34) \_\_\_\_\_

35) If three times a number added to 7 is divided by the number plus 8, the result is four thirds. Find the number.

35) \_\_\_\_\_

36) Five divided by the sum of a number and 2, minus the quotient of 3 and the difference of the number and 2 is equal to 6 times the reciprocal of the difference of the number squared and 4. What is the number?

36) \_\_\_\_\_

- 37) Five divided by the sum of a number and 10, minus the quotient of 3 and the difference of the number and 10 is equal to 6 times the reciprocal of the difference of the number squared and 100. What is the number? 37) \_\_\_\_\_
- 38) A painter can finish painting a house in 7 hours. Her assistant takes 9 hours to finish the same job. How long would it take for them to complete the job if they were working together? 38) \_\_\_\_\_
- 39) A painter can finish painting a house in 8 hours. Her assistant takes 10 hours to finish the same job. How long would it take for them to complete the job if they were working together? 39) \_\_\_\_\_
- 40) Mark and Rachel both work for Smith Landscaping Company. Mark can finish a planting job in 4 hours, while it takes Rachel 5 hours to finish the same job. If Mark and Rachel will work together on the job, and the cost of labor is \$45 per hour, what should the labor estimate be? (Round to the nearest cent, if necessary.) 40) \_\_\_\_\_
- 41) Mark and Rachel both work for Smith Landscaping Company. Mark can finish a planting job in 2 hours, while it takes Rachel 5 hours to finish the same job. If Mark and Rachel will work together on the job, and the cost of labor is \$45 per hour, what should the labor estimate be? (Round to the nearest cent, if necessary.) 41) \_\_\_\_\_
- 42) One pump can drain a pool in 11 minutes. When a second pump is also used, the pool only takes 6 minutes to drain. How long would it take the second pump to drain the pool if it were the only pump in use? 42) \_\_\_\_\_
- 43) One pump can drain a pool in 10 minutes. When a second pump is also used, the pool only takes 8 minutes to drain. How long would it take the second pump to drain the pool if it were the only pump in use? 43) \_\_\_\_\_
- 44) One conveyor belt can move 1000 boxes in 10 minutes. Another can move 1000 boxes in 12 minutes. If another conveyor belt is added and all three are used, the boxes are moved in 3 minutes. How long would it take the third conveyor belt alone to do the same job? 44) \_\_\_\_\_
- 45) One conveyor belt can move 1000 boxes in 6 minutes. Another can move 1000 boxes in 9 minutes. If another conveyor belt is added and all three are used, the boxes are moved in 3 minutes. How long would it take the third conveyor belt alone to do the same job? 45) \_\_\_\_\_

- 46) A baker can decorate the day's cookie supply four times as fast as his new assistant. If they decorate all the cookies working together in 32 minutes, how long would it take for each of them to decorate the cookies working individually? 46) \_\_\_\_\_
- 47) A baker can decorate the day's cookie supply four times as fast as his new assistant. If they decorate all the cookies working together in 24 minutes, how long would it take for each of them to decorate the cookies working individually? 47) \_\_\_\_\_
- 48) A cyclist bikes at a constant speed for 25 miles. He then returns home at the same speed but takes a different route. His return trip takes one hour longer and is 30 miles. Find his speed. 48) \_\_\_\_\_
- 49) A cyclist bikes at a constant speed for 16 miles. He then returns home at the same speed but takes a different route. His return trip takes one hour longer and is 21 miles. Find his speed. 49) \_\_\_\_\_
- 50) A car travels 400 miles on level terrain in the same amount of time it travels 160 miles on mountainous terrain. If the rate of the car is 30 miles per hour less in the mountains than on level ground, find its rate in the mountains. 50) \_\_\_\_\_
- 51) A boat moves 5 kilometers upstream in the same amount of time it moves 19 kilometers downstream. If the rate of the current is 7 kilometers per hour, find the rate of the boat in still water. 51) \_\_\_\_\_
- 52) A boat moves 5 kilometers upstream in the same amount of time it moves 20 kilometers downstream. If the rate of the current is 9 kilometers per hour, find the rate of the boat in still water. 52) \_\_\_\_\_
- 53) Jim can run 5 miles per hour on level ground on a still day. One windy day, he runs 12 miles with the wind, and in the same amount of time runs 6 miles against the wind. What is the rate of the wind? 53) \_\_\_\_\_
- 54) Jim can run 5 miles per hour on level ground on a still day. One windy day, he runs 11 miles with the wind, and in the same amount of time runs 5 miles against the wind. What is the rate of the wind? 54) \_\_\_\_\_

55) Jim can run 5 miles per hour on level ground on a still day. One windy day, he runs 10 miles with the wind, and in the same amount of time runs 7 miles against the wind. What is the rate of the wind?

55) \_\_\_\_\_

56) In a race, Car A starts 1 mile behind Car B. Car A is traveling at 45 miles per hour, while Car B is traveling at 40 miles per hour. How long will it take for Car A to overtake Car B?

56) \_\_\_\_\_

57) In a race, Car A starts 1 mile behind Car B. Car A is traveling at 55 miles per hour, while Car B is traveling at 40 miles per hour. How long will it take for Car A to overtake Car B?

57) \_\_\_\_\_

**Simplify.**

58)

$$\frac{\frac{5}{x} + \frac{6}{x^2}}{\frac{25}{x^2} - \frac{36}{x}}$$

58) \_\_\_\_\_

59)

$$\frac{\frac{1}{x} + \frac{7}{x^2}}{x + \frac{343}{x^2}}$$

59) \_\_\_\_\_

60)

$$\frac{\frac{6}{7-x} + \frac{7}{x-7}}{\frac{2}{x} + \frac{5}{x-7}}$$

60) \_\_\_\_\_

61)

$$\frac{\frac{2}{x} + 9}{\frac{4}{x^2} - 81}$$

61) \_\_\_\_\_

62)

$$\frac{1 - \frac{8}{x}}{x - \frac{64}{x}}$$

62) \_\_\_\_\_

63)

$$\frac{\frac{x}{4} - \frac{1}{x}}{1 + \frac{2}{x}}$$

63) \_\_\_\_\_

64)

$$\frac{\frac{x-5}{3}}{\frac{x-4}{x}}$$

64) \_\_\_\_\_

65)

$$\frac{4 + \frac{2}{x}}{\frac{x}{4} + \frac{1}{8}}$$

65) \_\_\_\_\_

66)

$$\frac{\frac{x+1}{6}}{\frac{5x-1}{12}}$$

66) \_\_\_\_\_

67)

$$\frac{\frac{5}{x} + \frac{6}{x^2}}{\frac{25}{x^2} - \frac{36}{x}}$$

67) \_\_\_\_\_



68)

$$\frac{\frac{6}{7-x} + \frac{7}{x-7}}{\frac{5}{x} + \frac{2}{x-7}}$$

68) \_\_\_\_\_

69)

$$\frac{\frac{2}{x} + 3}{\frac{4}{x^2} - 9}$$

69) \_\_\_\_\_

Find and simplify the difference quotient  $\frac{f(a+h) - f(a)}{h}$ ,  $h \neq 0$  for the given function.

70)  $f(x) = \frac{5}{x}$

70) \_\_\_\_\_

71)  $f(x) = \frac{8}{x^2}$

71) \_\_\_\_\_

Simplify.

72)  $\frac{m^{-1} + z^{-1}}{m^{-1} - z^{-1}}$

72) \_\_\_\_\_

73)  $\frac{x^{-2}}{x^{-2} - y^{-2}}$

73) \_\_\_\_\_

74)  $\frac{-7x^{-1} - 5y^{-1}}{2x^{-2} + 7y^{-2}}$

74) \_\_\_\_\_

75)  $\frac{-7x^{-1} - 4y^{-1}}{4x^{-2} - 8y^{-2}}$

75) \_\_\_\_\_

$$76) \frac{2x^{-1} + (9y)^{-1}}{x^{-2}}$$

76) \_\_\_\_\_

$$77) \frac{7x^{-1} + (9y)^{-1}}{x^{-2}}$$

77) \_\_\_\_\_

$$78) \frac{(x+9)^{-1} + (x-9)^{-1}}{(x^2 - 81)^{-1}}$$

78) \_\_\_\_\_

$$79) \frac{(x+4)^{-1} + (x-4)^{-1}}{(x^2 - 16)^{-1}}$$

79) \_\_\_\_\_

$$80) \frac{\frac{2}{x} - \frac{5}{y} - \frac{3}{xy}}{5y^{-1} + 2x^{-3}}$$

80) \_\_\_\_\_

If y varies directly as x, find the direct variation equation for the situation.

81)  $y = 2$  when  $x = 14$

81) \_\_\_\_\_

Solve.

82) If the resistance in an electrical circuit is held constant, the amount of current flowing through the circuit is directly proportional to the amount of voltage applied to the circuit. When 7 volts are applied to a circuit, 70 milliamperes of current flow through the circuit. Find the new current if the voltage is increased to 14 volts.

82) \_\_\_\_\_

Write an equation to describe the variation. Use k for the constant of proportionality.

83) s varies inversely as m

83) \_\_\_\_\_

**Solve.**

- 84) If the force acting on an object stays the same, then the acceleration of the object is inversely proportional to its mass. If an object with a mass of 80 kilograms accelerates at a rate of 3 meters per second per second by a force, find the rate of acceleration of an object with a mass of 8 kilograms that is pulled by the same force. 84) \_\_\_\_\_

**Write an equation to describe the variation. Use k for the constant of proportionality.**

- 85)  $x$  varies jointly as  $y$  and  $z$ . 85) \_\_\_\_\_

**Find the variation equation for the variation statement.**

- 86)  $z$  varies jointly as  $y$  and the cube of  $x$ ;  $z = 336$  when  $x = 2$  and  $y = -6$  86) \_\_\_\_\_

**Solve.**

- 87) The amount of paint needed to cover the walls of a room varies jointly as the perimeter of the room and the height of the wall. If a room with a perimeter of 45 feet and 8-foot walls requires 3.6 quarts of paint, find the amount of paint needed to cover the walls of a room with a perimeter of 75 feet and 10-foot walls. 87) \_\_\_\_\_

- 88) The amount of simple interest earned on an investment over a fixed amount of time is jointly proportional to the principle invested and the interest rate. A principle investment of \$4700.00 with an interest rate of 7% earned \$1645.00 in simple interest. Find the amount of simple interest earned if the principle is \$1300.00 and the interest rate is 4%. 88) \_\_\_\_\_

**Write an equation to describe the variation. Use k for the constant of proportionality.**

- 89)  $q$  varies directly as the square of  $r$  and inversely as  $s$ . 89) \_\_\_\_\_

**Find the variation equation for the variation statement.**

- 90)  $c$  varies directly as  $a$  and inversely as  $b$ ;  $c = 3$  when  $a = 24$  and  $b = 32$  90) \_\_\_\_\_

# Answer Key

## Testname: MAT1033 - REVIEW 3

1)  $4x - 8 + \frac{7}{x}$

2)  $4x + 8 - \frac{12}{2x}$

3)  $x + 7$

4)  $2m - 4$

5)  $x - 6$

6)  $x + 10$

7) 1

8)  $\frac{x}{x - 2}$

9)  $y - 2$

10)  $-\frac{x + 9}{x + 7}$

11)  $\frac{z + 6}{z}$

12) 0

13) -8

14) 4, 6

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

16)  $a = \frac{b}{bc - 1}$

17) -6

18)  $\frac{42}{5}$

19) 76

20) 110 lb

21) 28 passes

22) 5 in.

23) 850 km

24) 5 people

25) 63 oz

26)  $x = 10$

27)  $x = 10$

28)  $\frac{5}{2}$

29)  $\frac{5}{2}$

30)  $\frac{5}{2}$

31) 31

32) 20

33)  $\frac{39}{5}$

# Answer Key

Testname: MAT1033 - REVIEW 3

34)  $\frac{1}{5}$

35)  $\frac{11}{5}$

36) 11

37) 43

38)  $3\frac{15}{16}$  hr

39)  $4\frac{4}{9}$  hr

40) \$100.00

41) \$64.29

42)  $13\frac{1}{5}$  min

43) 40 min

44)  $6\frac{2}{3}$  min

45) 18 min

46) baker: 40 min  
assistant: 160 min

47) baker: 30 min  
assistant: 120 min

48) 5 mph

49) 5 mph

50) 20 mph

51) 12 km/hr

52) 15 km/hr

53)  $1\frac{2}{3}$  mph

54)  $1\frac{7}{8}$  mph

55)  $\frac{15}{17}$  mph

56) 12 min

57) 4 min

58)  $\frac{5x + 6}{25 - 36x}$

59)  $\frac{1}{x^2 - 7x + 49}$

60)  $\frac{x}{7x - 14}$

61)  $\frac{x}{2 - 9x}$

62)  $\frac{1}{x + 8}$

# Answer Key

Testname: MAT1033 - REVIEW 3

$$63) \frac{x-2}{4}$$

$$64) \frac{x(x-5)}{3(x-4)}$$

$$65) \frac{16}{x}$$

$$66) \frac{2(x+1)}{5x-1}$$

$$67) \frac{5x+6}{25-36x}$$

$$68) \frac{x}{7x-35}$$

$$69) \frac{x}{2-3x}$$

$$70) \frac{-5}{a(a+h)}$$

$$71) \frac{-8(2a+h)}{a^2(a+h)^2}$$

$$72) \frac{z+m}{z-m}$$

$$73) \frac{y^2}{y^2-x^2}$$

$$74) \frac{-7xy^2-5x^2y}{2y^2+7x^2}$$

$$75) \frac{-7xy^2-4x^2y}{4y^2-8x^2}$$

$$76) \frac{18xy+x^2}{9y}$$

$$77) \frac{63xy+x^2}{9y}$$

$$78) 2x$$

$$79) 2x$$

$$80) \frac{2x^2y-5x^3-3x^2}{5x^3+2y}$$

$$81) y = \frac{1}{7}x$$

$$82) 140 \text{ milliamperes}$$

$$83) s = \frac{k}{m}$$

$$84) 30 \text{ meters per second per second}$$

$$85) x = kyz$$

$$86) y = -7x^3y$$

$$87) 7.5 \text{ quarts}$$

Answer Key

Testname: MAT1033 - REVIEW 3

88) \$260.00

89)  $q = \frac{kr^2}{s}$

90)  $c = \frac{4a}{b}$