Algebra 2 Workbook

Systems of equations

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SYSTEMS WITH SUBSCRIPTS

■ 1. Solve the system of equations using any method.

$$d_t = x_t - 3$$

$$d_t = \frac{1}{2}x_t + 2$$

■ 2. Solve the system of equations using any method.

$$4A_x - B_y = 15$$

$$B_y = 12 - 5A_x$$

■ 3. Solve the system of equations using any method.

$$2\,T_x + 5\,T_y = 120.8$$

$$T_y = 17\,T_x + 17.2$$

■ 4. Solve the system of equations using any method.

$$T_u R_u = 480$$

$$R_d = \frac{1}{2}R_u$$

$$T_d R_d = 320$$

$$T_d = 2 + T_u$$

■ 5. Solve the system of equations using any method.

$$2X_1 + 3Y_1 = 1$$

$$X_2 = 4X_1$$

$$X_2 + Y_2 = 9$$

$$Y_2 = Y_1 + 2$$

■ 6. Solve the system of equations using any method.

$$6X_1 + 12Y_1 = 78$$

$$X_2 = 2X_1$$

$$2X_2 - 3Y_2 = -24$$

$$Y_2 = 3Y_1 - 3$$

UNIFORM MOTION PROBLEMS

■ 1. Kaitlyn is driving at a constant rate of 55 mph on the highway. 1 hour later, her friend Charlotte starts from the same point and drives at a constant rate of 65 mph. How many hours will each woman need to travel before Charlotte catches Kaitlyn. At that point, how far have each of them traveled?

■ 2. Sam walked 4 mph from the bus stop to the school. John walked 5 mph from the same bus stop to the school and it took him 1 hour to get there. How long did it take Sam to get to the school?

■ 3. McKenzie and Daisy plan a trip to the mountains together. McKenzie travels at 45 mph and Daisy travels at 60 mph. Daisy's trip took 3 hours less than McKenzie's. How far did each of them travel?

■ 4. Talan and Emily participate in a race together. Talan runs 10 mph and finishes 1 hour and 18 minutes before Emily does. If Emily runs 5 mph, how long does it take each person to finish the race and how far did they run?

■ 5. Adeline and Ellie live 10 miles away from each other. Adeline started walking towards Ellie at $1:00$ p.m.. Ellie left 1 hour later and walked at a rate of 4 mph. If they met at $3:00$ p.m., how fast did Adeline walk?

■ 6. A train traveled 420 miles at 48 mph and arrived 1 hour and 45 minutes later than it was scheduled to arrive. How fast should the train have traveled in order to arrive on time?

NUMBER WORD PROBLEMS

■ 1. The sum of two consecutive odd integers is -8. What are the two numbers?

■ 2. The product of two consecutive integers is 182. What are the two numbers if they are both negative?

■ 3. The sum of the digits of a two-digit counting number is 11. When the digits are reversed, the new number is 63 greater than the original number. What was the original number?

■ 4. The sum of the digits of a two-digit counting number is 14. The ratio of the units digit to the tens digit is 3 to 4. What is the number?

■ 5. The sum of the digits of a two-digit counting number is 8. The ratio of the tens digit to the units digit is 3 to 1. What is the number?

■ 6. Find three negative consecutive odd integers such that the sum of the first and third is 49 less than the product of the second and third.

AGE WORD PROBLEMS

■ 1. In 16 years, Thorin will be nine times older than he is now. How old is he now?

■ 2. In 12 years, Jake will be four times as old as he was nine years ago. How old will he be in 12 years?

■ 3. In 16 years, Erica will be six times as old as she was 14 years ago. How old was she four years ago?

■ 4. 10 years ago, Tim was three years younger than twice Sally's age. 17 years from now Sally will be seven years older than 5/8 of Tim's age. How old are Sally and Tim now?

■ 5. Jessica is five years younger than Ryan. 12 years ago, Jessica was half the age Ryan will be in three years. How old is Jessica now?

■ 6. Kate is five times older than Sam. Five years ago, Kate was 15 times older than Sam. How old will Sam be in three years?

SYSTEMS WITH NON-LINEAR EQUATIONS

■ 1. Solve the system of equations.

$$y = x - 1$$

$$x^2 + y^2 = 1$$

■ 2. Solve the system of equations.

$$y - 2x = 0$$

$$(x - 2)^2 + (y - 1)^2 = 9$$

■ 3. Solve the system of equations.

$$2y - x = -2$$

$$(x - 6)^2 + 4(y - 4)^2 = 16$$

■ 4. Solve the system of equations.

$$y = \frac{1}{2}x + 1$$

$$x^2 - y^2 = 4$$

■ 5. Solve the system of equations.

$$y = -\frac{1}{2}x - 3$$

$$\frac{(x-3)^2}{9} - \frac{(y+3)^2}{9} = 1$$

■ 6. Solve the system of equations.

$$2y - 3x = 14$$

$$\frac{(y+2)^2}{9} + \frac{(x+4)^2}{4} = 1$$

SYSTEMS OF THREE EQUATIONS

■ 1. Find the unique solution to the system of equations.

$$2x + y - z = 3$$

$$x - y + z = 0$$

$$x - 2y - 3z = 4$$

■ 2. Find the unique solution to the system of equations.

$$3x + y - z = -2$$

$$x - 2y + 3z = 23$$

$$2x + 3y + 2z = 5$$

■ 3. Find the unique solution to the system of equations.

$$-2x + 3y - 4z = 10$$

$$4x + 3y + 2z = 4$$

$$x - 6y + 4z = -19$$

■ 4. Find the unique solution to the system of equations.

$$2x - y + z = 9$$

$$4x - 2y + 2z = 18$$

$$-2x + y - z = -9$$

■ 5. Find the unique solution to the system of equations.

$$x + 2y - z = 9$$

$$3x + y - z = 5$$

$$-x - 4y + z = 2$$

■ 6. Find the unique solution to the system of equations.

$$-x + y - z = 12$$

$$x - y + z = 2$$

$$2x - 2y + 2z = 9$$

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