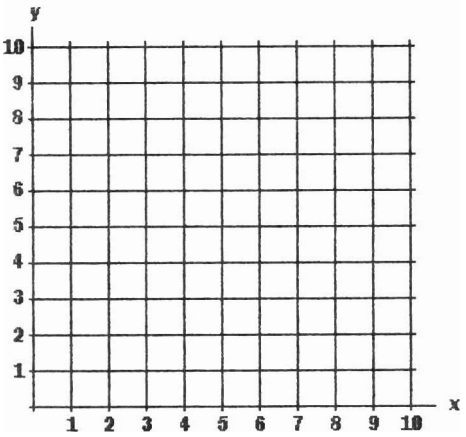
Algebra Preliminaries for Finite Math

1. Graph the lines $3x + 2y = 18$ and $2x + 5y = 20$ in the given coordinate system.



2. On the graph from #1, shade the solution to the system of inequalities:

$$3x + 2y \leq 18$$
$$2x + 5y \geq 20$$
$$x, y \geq 0$$

3. Solve for the exact coordinates of the point of intersection of the lines in #1.

4. Solve the system of equations:

$$p = .08x + 15$$
$$p = 99 - .16x$$

5. Solve the system of equations:

$$2x - 3y + 2z = 1$$
$$3x + 2y + 3z = 21$$
$$4x - 3y + 5z = 9$$

6. Given that x_1, x_2, and x_3 must all be integers, none of them negative, and that

$$x_1 = 15 - 2t, \quad x_2 = 3t - 8, \quad \text{and} \quad x_3 = t,$$

find all possible values of t.

Items 7 and 8 refer to the following facts about a company that builds bookcases, tables, and chairs:

Each bookcase requires \$40 of material and \$70 of labor, each table \$45 of material and \$55 of labor, and each chair \$25 of material and \$40 of labor. Each bookcase sells for \$180, each table for \$160, and each chair for \$90.

Let x_1 be the number of bookcases, x_2 the number of tables, and x_3 the number of chairs.

7. Give the system of equations corresponding to a situation in which the company uses \$9000 worth of material, \$13000 worth of labor, and gets \$35000 in sales. Do not solve the system of equations.

8. Give the system of inequalities corresponding to a situation in which the company uses less than \$9000 worth of material, no more than \$13000 worth of labor, and gets at least \$35000 in sales. Do not solve the system of inequalities.

Items 9 through 14 will require the use of a scientific calculator. Give answers correct to two decimal places.

9. Solve the equation: $A = P(1+rt)$ for P, given that $A = 1000$, $r = .085$, and $t = 2.5$

10. Solve the equation: $A = P(1+rt)$ for t, given that $A = 800$, $r = .135$, and $P = 600$

11. Perform the calculation: $378.49\left(1+\frac{r}{m}\right)^{mt}$, where $m = 12$, $r = 0.07$, and $t = 5$.

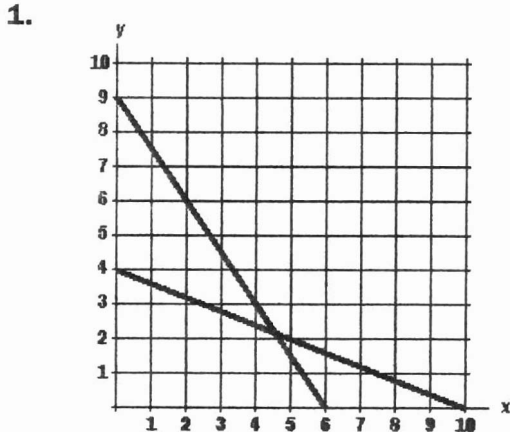
12. Perform the calculation: $231.75\,\frac{(1+p)^n - 1}{p}$, where $p = 0.0075$ and $n = 60$.

13. Solve the equation: $500\,e^{.07t} = 1200$, for t.

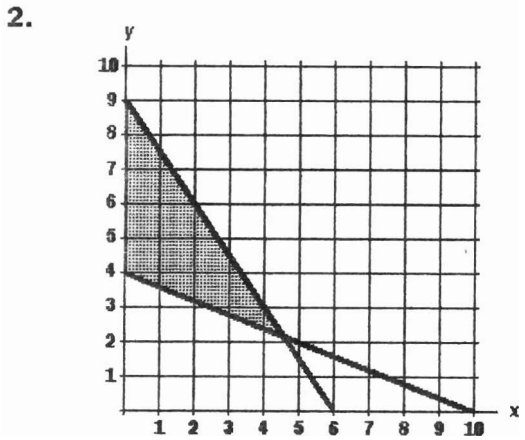
14. Solve the equation: $1.005^n = 2$, for n.

Answers

1.



2.



3. $x = 50/11$, $y = 24/11$

4. $x = 350$; $p = 43$

5. $x = 7$, $y = 3$, $z = -2$

6. {3,4,5,6,7}

7. $40x_1 + 45x_2 + 25x_3 = 9000$
   $70x_1 + 55x_2 + 40x_3 = 13000$
   $180x_1 + 160x_2 + 90x_3 = 35000$

8. $40x_1 + 45x_2 + 25x_3 < 9000$
   $70x_1 + 55x_2 + 40x_3 \leq 13000$
   $180x_1 + 160x_2 + 90x_3 \geq 35000$

9. $P = 824.74$

10. $t = 2.47$

11. 536.56

12. 17,479.54

13. $t = 12.51$

14. $n = 138.98$