

Algebra Preliminaries for Finite Math

(revised June, 2012)

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

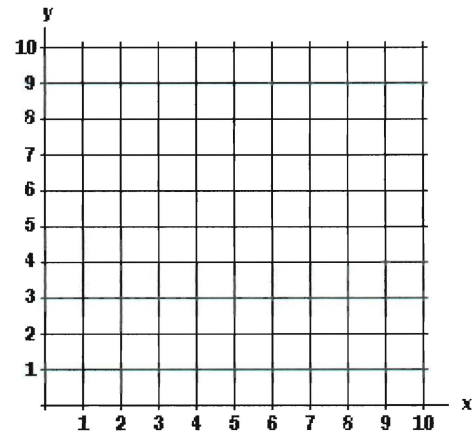
2. On the graph from #1, shade the solution to the system of inequalities:

$$3x + 2y \leq 18$$

$$2x + 5y \geq 20$$

$$x, y \geq 0$$

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



4. Given that $x = 500$ when $p = 10$, and $x = 300$ when $p = 11$, express p as a linear function of x . Write your answer in the form: $p = mx + b$.

5. Solve the system of equations:
- $$p = .08x + 15$$
- $$p = 99 - .16x$$

6. Verify that $x_1 = 15 - 2t$, $x_2 = 3t - 8$, and $x_3 = t$ is a solution to the following system of equations for any value of t :

$$x_1 + x_2 - x_3 = 7$$
$$2x_1 + x_2 + x_3 = 22$$

7. If the solutions to the equations in #6 must be whole numbers (nonnegative integers), find all possible values of t .

Items 8 and 9 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.

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

9. 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 10 through 15 will require the use of a scientific calculator. Give answers correct to two decimal places.

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

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

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

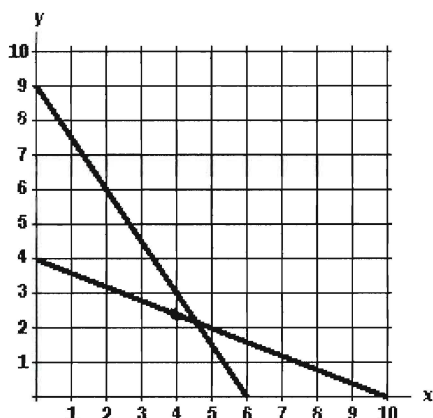
13. Perform the calculation: $231.75 \frac{(1+p)^n - 1}{p}$, where $p = 0.0075$ and $n = 60$.

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

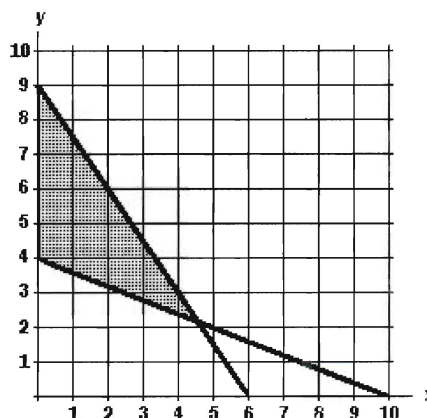
15. Solve the equation: $1.005^n = 2$, for n .

Answers

1.



2.



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

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

5. $p = -0.005x + 12.5$

6. $(15 - 2t) + (3t - 8) - t = 7$

$2(15 - 2t) + (3t - 8) + t = 22$ (Note that all t's cancel out.)

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

8. $40x_1 + 45x_2 + 25x_3 = 9000$

$70x_1 + 55x_2 + 40x_3 = 13000$

$180x_1 + 160x_2 + 90x_3 = 35000$

9. $40x_1 + 45x_2 + 25x_3 < 9000$

$70x_1 + 55x_2 + 40x_3 \leq 13000$

$180x_1 + 160x_2 + 90x_3 \geq 35000$

10. $P = 824.74$

11. $t = 2.47$

12. 536.56

13. 17,479.54

14. $t = 12.51$

15. $n = 138.98$