

1. Factor completely.

a. $x^2 + 8x + 16$ b. $1 - m^2n^4$ c. $10x^2 + 11x - 6$

2. Simplify

a. $\frac{x^{-\frac{1}{2}}}{1 + \frac{1}{x}}$ b. $\frac{14a^3b^3c^2}{-7a^2b^4c^2}$ c. $\frac{3^{1/2} 3^{-2/3}}{3^{-1/2} 3^{1/3}}$

3. Evaluate $4x^{-2/3} + 3x^{1/3} + 2$ for $x = 8$.

4. Show that $(\sqrt{5} + \sqrt{2})^2 = 7 + 2\sqrt{10}$.

5. Rationalize the denominator and simplify: $\frac{1+\sqrt{5}}{1-\sqrt{5}}$.

6. Solve for a : $T = 2x - \frac{m}{a}$.

7. The sum of two numbers is 37. If the larger is divided by the smaller, the quotient is 3 and the remainder is 5. Find the numbers.

8. One leg of a right triangle is 20 cm and the hypotenuse is 10 cm longer than the other leg. Find the lengths of the unknown sides.

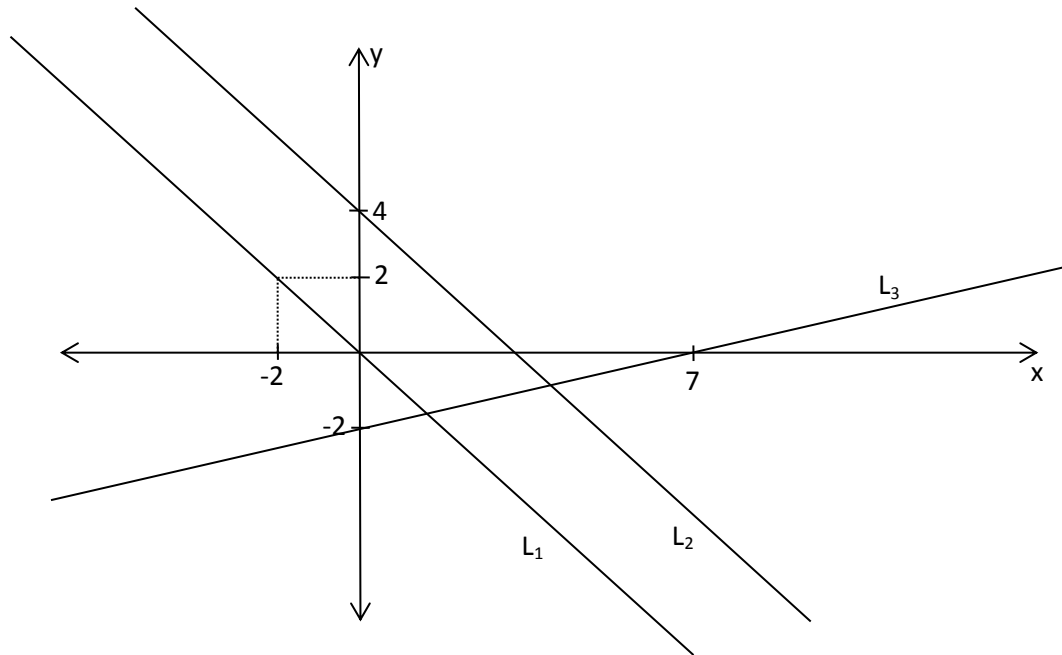
9. Solve for x .

a. $2(x - 1) = 3(6 - x)$ b. $\frac{2x+1}{x} + \frac{x-4}{x+1} - 3 = 0$

10. A labor report states that in a certain factory a total of 400 men and women are employed. The average daily wage is \$16 for a man and \$12 for a woman. If the labor cost is \$5720 per day, how many women are employed?

11.

a. Write the linear equations that correspond to the lines L_1 , L_2 and L_3 in the graph below; assume that L_1 is parallel to L_2 .



b. Consider the system of linear equations consisting of the equations of the lines L_1 and L_2 . What is the solution to the system?

c. Consider the system of linear equations consisting of lines L_1 and L_3 , what is the solution to the system?

d. Give the equation of a line perpendicular to L_1 that goes through the point $(1, 0)$. Graph the line in a Cartesian plane and clearly indicate the x - and y -intercepts.

12. Solve the linear inequalities:

a. $3x + 5 \leq 4x + 1$

b. $|x + 1| > 2$

13. Consider the following system of linear equations:

$$\begin{cases} x + 1 = y \\ 2y = 4x - 6 \end{cases}$$

- Solve the system.
- Graph the two equations in the same Cartesian plane.
- Clearly indicate in the graph the x- and y-intercepts.
- Clearly indicate in the graph the solution you found in a.

14. Solve the following systems of linear equations, or explain why the solution does not exist:

a. $\begin{cases} x + y = -1 \\ x - y = 0 \end{cases}$

b. $\begin{cases} x + y = -1 \\ -x - y = 0 \end{cases}$

c. $\begin{cases} x + y = -1 \\ -x - y = 1 \end{cases}$

15. Evaluate the expression $\frac{x+1}{x^3-1}$ for $x = 1$ and for $x = -1$, if possible; if it is not possible, clearly indicate why not.

16. Recall the quadratic formula to solve quadratic equations of the form $ax^2 + bx + c = 0$.

$$\frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

- How many solutions does a quadratic equation of the form $ax^2 + bx + c = 0$ have if ac is negative? Clearly explain your answer.
- Use the formula to solve the equation $-x^2 + x + 2 = 0$.