

Solve the following equations. If no solutions exist, write no solution.

$$2|x - 4| - 2 = 10$$

$$|3x + 15| = 0$$

The sum of three consecutive numbers is 63. What are the numbers?

Xiaolong receives a salary of \$250 each week for his work in the Math Lab. He receives an additional \$10 for each hour that he volunteers in the Testing Center. Write an *equation* for the amount he earns in one week (P in \$) if he works h hours in the Testing Center that week.

Solve the following inequalities. Write the solution set in interval notation.

$$5 - 2x > -3$$

$$-1 \leq x + 4 \leq 5$$

$$|x + 5| > 7$$

$$|4x| \leq 8$$

Give the domain of the following functions in interval notation.

$$f(x) = \frac{16}{4 - 2x}$$

$$f(x) = 3\sqrt{x + 3}$$

Sketch a graph of the equation $y = \frac{1}{3}x - 2$

Sketch a graph of the function $f(x) = 4|x| - 1$

Sketch a graph of the equation $4x - 3y = 24$

Write the equation for the line with a slope of -4 that passes through (2, 2)

Write the equation for the line that passes through (0, 2) and (-2, 2)

Write the equation for the line that is perpendicular to $y = 2$ and passes through (4, 5)

Useful Formulas and Equations

Slope of the line between two points: $m = \frac{y_2 - y_1}{x_2 - x_1}$

Slope-Intercept form of a linear equation: $y = mx + b$

Point-Slope Equation of a line: $(y - y_1) = m(x - x_1)$

Equation of a vertical line: $x = a$

Equation of a horizontal line: $y = b$

In one afternoon, a movie theatre sells 350 tickets. Adult tickets sell for \$8 each while child tickets are sold for \$5 each. If the total sales for the afternoon were \$2470, how many of each type of ticket were sold?

Solve.

$$x > 3$$

$$y \leq 4$$

$$y \geq -2x$$

$$y < 3x - 2$$

$$2x - 4y = -1$$

$$x = 2y + 1$$

$$3x + y = 5$$

$$5x - 4y = -3$$

$$-3x + 3y = 9$$

$$y = x + 3$$

$$6x - 5y = 3$$

$$4x + 3y = 21$$

Perform the given operations.

$$(3x^2 - x + 7) - (x^2 + 2x - 4)$$

$$(x - 5)^2$$

$$(3x + 2)(3x + 5)$$

$$(3x + 4)^2$$

Factor.

$$3x^3 - 12x$$

$$2x^2 + 5x - 7$$

$$x^2 + 4x - 12$$

$$x^3 - 6x^2 - 3x + 18$$

$$16x^2 + 8x + 1$$

$$x^4 - 16$$

Solve.

$$x^2 - 3x - 18 = 0$$

$$5x^2 - 125 = 0$$

Perform the indicated operations and simplify.

$$\frac{3x-1}{x+6} + \frac{x}{x-2}$$

$$\frac{x^2-y^2}{5x-5y} \cdot \frac{x-y}{x+y}$$

$$\frac{x^2-4x}{x^2+2x} \div \frac{x^2-8x+16}{x^2+4x+4}$$

Divide. Clearly label the quotient and remainder.

$$(x^4 - 3x^2 + 2) \div (x + 3)$$

$$(x^2 - 4x - 12) \div (x - 6)$$

$$(9x^2 + 24x + 17) \div (3x + 2)$$

Solve.

$$\frac{5}{3x+2} = \frac{3}{2x}$$

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

$$\frac{2}{x-3} + \frac{1}{4x+20} = \frac{1}{x^2+2x-15}$$

Chris's boat has a top speed of 20 miles per hour in still water. While traveling on a river at top speed, he went 40 miles upstream in the same amount of time he went 60 miles downstream. Find the rate of the river current.

There is a sales tax of \$15 on an item that costs \$105 before tax. If the sales tax on a second item is \$10, how much does the second item cost before tax?

Pablo worked 7 hours yesterday and earned \$91. Write an equation of variation that for the amount of money Pablo earns with respect to the hours he works.

If Pablo earned \$65 today, how many hours did he work today?

Simplify.

$$\sqrt[9]{(-3)^9}$$

$$\sqrt[4]{16x^4}$$

$$\sqrt{32x^3}$$

$$\sqrt{\frac{25x^2}{36y^4}}$$

$$\sqrt{98} + 2\sqrt{18} - 3\sqrt{32}$$

$$\sqrt{-64} \cdot \sqrt{-4}$$

Perform the indicated operations and simplify. Write answers in $a + bi$ format if necessary.

$$(4 - 2i)(4 + 2i)$$

$$\frac{1 + 2i}{3 + 4i}$$

Solve.

$$\sqrt{x - 1} + 3 = x$$

$$\sqrt{3x - 2} - 3 = -8$$

Solve using any method.

$$(x + 2)^2 + 4 = 0$$

$$x^2 - 12x + 27 = 0$$

$$x^2 - 7x + 13 = 0$$

$$x^4 - 13x^2 + 36 = 0$$

For each function below, find and label the vertex, axis of symmetry and the maximum or minimum value. Then sketch a graph of the function.

$$f(x) = -(x - 1)^2 + 3$$

$$f(x) = x^2 + 2x - 8$$

Evaluate each logarithm.

$$\log_4\left(\frac{1}{64}\right)$$

$$\log_2(32)$$

$$\ln\left(\frac{1}{e^2}\right)$$

$$\log(10000)$$

Rewrite the expression as a sequence of sums and differences of logarithms.

$$\ln\left(\frac{\sqrt[3]{a}}{b^4 c^2}\right)$$

Rewrite the expression as a single logarithm and simplify if necessary.

$$3\log(x) - 2\log(y) - \log(z)$$

Find the inverse of the given functions.

$$f(x) = \sqrt[3]{x} + 9$$

$$f(x) = 4x - 7$$

$$f(x) = 2^x + 1$$

Solve.

$$8 = 16^x$$

$$3^{4x-1} = 27$$

$$5^{x-1} = 125$$

$$2^{2x} = \frac{1}{16}$$

Solve.

$$\log_4(2x + 4) = 3$$

$$\log_4(x) + \log_4(x - 3) = 1$$

$$\log_6(3x + 6) - \log_6(x - 4) = 1$$

Find each composite function using $f(x) = 5x - 3$ and $g(x) = 2x^2$.

$$(f \circ g)(x)$$

$$(g \circ f)(x)$$

Determine if the following functions are inverse functions of one another.

$$f(x) = \frac{x-7}{3} \text{ and } g(x) = 3(x+7)$$

$$f(x) = \sqrt{4x+3} \text{ and } g(x) = \frac{x^2-3}{4}$$

Find the equation of the circle with center $(-2, -2)$ with a point on the circle at $(3, 0)$.

Useful Formulas:

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

$$(x-h)^2 + (y-k)^2 = r^2$$