

1. Find the solutions to the equations or inequalities below. All solutions must be exact solutions. Do not give an approximate solution. If there are extraneous solutions, please state so.

a. $3x^2 - 11x + 10 = 0$

b. $3x^{2/3} - 11x^{1/3} + 10 = 0$

c. $2^{3x-1} = 4^{x^2}$

d. $\log_2(x - 1) + 3 = \log_2(2x + 1)$

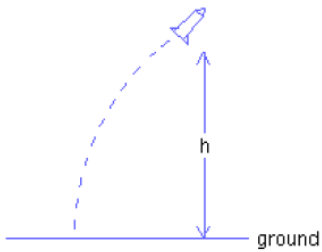
e. $300(e^{0.01t}) = 20$

f. $2^{3x-1} = 5^{2x-1}$

2. A rocket model is launched with an initial velocity of 235 ft/s. The rocket's height h (in feet) after t seconds is given by the following.

$$h = 235t - 16t^2$$

Find all the values of t for which the rocket's height is 151 feet. Round your answers to the nearest hundredth. If there is more than one answer, use or to separate them.



3. The profit P in (dollars) of selling x cupcakes a club fund raiser is given by the function $P(x) = -0.0075x^2 + 1.125x$. What is the maximum profit you will make at the fund raiser? How many cupcakes will you need to sell to make this profit. Round your answer to the nearest dollar.

4. The function below has at least one rational zero. Use this fact to find all zeros of the function.

$$h(x) = 5x^4 - 29x^3 - 40x^2 - 13x - 7$$

5. Half-life of penicillin (a form of antibiotic) is about 35 minutes for an adult with normal renal function (or kidneys). Initial dose for an adult is between 250-3000mg 2 to 4 times a day to treat different kinds of bacterial infections. If an adult was accidentally given an over dose of 6000mg in one dose. How long will it take for the dose to come down to 200mg assuming that the adult drank a lot of fluids to flush the drug out of their system?

6. Amy invested \$3200 at 2.4% interest compounded quarterly. How many years will she will have to wait for double her money?

7. Solve the system of equations and inequalities below.

a.
$$\begin{cases} 3x - y = 4 \\ x - 2y = 3 \end{cases}$$

b.
$$\begin{cases} x^2 + y^2 = 4 \\ x - y^2 = -2 \end{cases}$$

c.
$$\begin{cases} x - y < 4 \\ x - 2y \geq 3 \end{cases}$$