

1. Solve algebraically:

a)
$$\begin{aligned}4x + 2y - 6z &= -38 \\5x - 4y + z &= -18 \\x + 3y + 7z &= 38\end{aligned}$$

b)
$$\begin{aligned}6x + 2y - 3z &= -17 \\7x - 5y + z &= 72 \\2x + 8y + 3z &= -21\end{aligned}$$

c)
$$\begin{aligned}4x + y + z &= 5 \\3x + 3y - 2z &= 22 \\x - 2y - z &= 3\end{aligned}$$

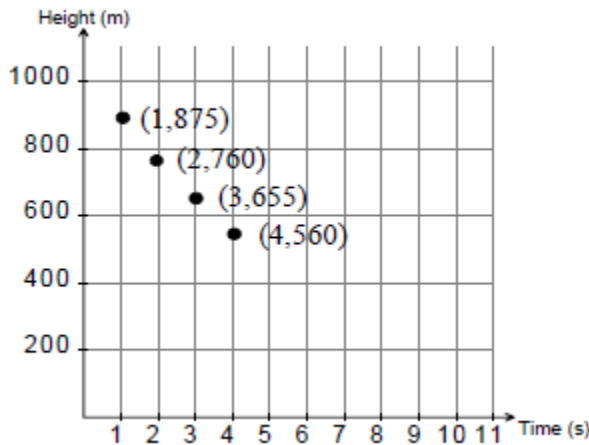
d)
$$\begin{aligned}3x - 2y + 2z &= 0 \\2x + y - z &= 0 \\2x - y + 3z &= 0\end{aligned}$$

2. Billy's Restaurant ordered 200 flowers for Mother's Day. They ordered carnations at \$1.50 each, roses at \$5.75 each, and daisies at \$2.60 each. They ordered mostly carnations, and 20 fewer roses than daisies. The total order came to \$589.50. How many of each type of flower was ordered?
3. The Arcadium arcade in Lynchburg, Tennessee uses 3 different coloured tokens for their game machines. For \$20 you can purchase any of the following mixtures of tokens: 14 gold, 20 silver, and 24 bronze; OR, 20 gold, 15 silver, and 19 bronze; OR, 30 gold, 5 silver, and 13 bronze. What is the monetary value of each token?
4. Last Tuesday, Regal Cinemas sold a total of 8500 movie tickets. Proceeds totalled \$64,600. Tickets can be bought in one of 3 ways: a matinee admission costs \$5, student admission is \$6 all day, and regular admissions are \$8.50. How many of each type of ticket was sold if twice as many student tickets were sold as matinee tickets?
5. Brass is a mixture of copper and zinc. A brass block containing 60% zinc and a brass bar containing 40% zinc are melted together. The resulting mixture is 51% zinc. If 400 kg of the new mixture is obtained, what was the mass of the original two blocks.
6. A cleanser, containing 10% ammonia is mixed with another cleanser containing 20% ammonia. The resulting solution contains 17% ammonia. If 100 L of the 17% ammonia solution is obtained, how much of each cleanser was used?

7. The data in the table shows the height, in metres above the ground, of a snowball at various times. Set up a system of equations and using matrices, create a function that represents the height of the snowball after t seconds.

Time, t (sec)	1	2	3	4	5
Height, h (m)	25.1	38.4	41.9	35.6	19.5

8. A small plane begins a parabolic dive. The graph shows the plane's height, in metres, above the ground over time, in seconds, during a parabolic dive. Set up a system of equations and using matrices determine the quadratic function that defines the path of the plane, then use it to determine the plane's height at 9.5 seconds.



9. A flare is fired as a distress signal and its height, h in metres above the ground, t seconds after firing, is provided in the table below. Algebraically determine the quadratic function that defines the height of the flare above the ground t seconds after firing, and use it to determine the flare's height at 2.4 seconds.

t	1	2	3	4
h	97	182	257	322

10. An archer atop a turret shoots an arrow as shown. The height of the arrow, h , in metres above the ground, t seconds after shooting, is shown in the table below. Algebraically determine the function that defines the height h of the arrow above the ground t seconds after shooting.

t	1	2	3
h	45.1	50.4	45.9