

- 1 Set up a system of equations to find the ortho-centre of a triangle with vertices $(-3,6)$, $(8, -8)$ and $(0,-8)$.
- 2 The lines $y = ax+9$ and $ax+by$ are equation of the same function. Using systems of equations, what is the value of $a^2 - 2b^2$?
- 3 A chemist is mixing two solutions. Solution A has a concentration of 40% KNO_3 while solution B has a concentration of 70% KNO_3 . Set up a system of equations to determine how much of each must be mixed to create a solution that is 4500 ml of 55% concentration KNO_3 .
- 4 A dark green and light green paint have different ratios of green to white. The dark green has a ratio of 1: to 3 green to white paint. The lighter shade has a ratio of 1 to 4 of green to white. If you have 60 litres of paint to make, and 10 parts should be green, how much from each should be combined to form the 60 litres of paint.
- 5 A telephone company offers two different rates when phoning in Canada and to the United States. Roland received a long distance bill of \$51 for being on the phone for 60 minutes to the States and 90 minutes for within Canada. Julia received a bill of \$74 for being on the phone for 120- minutes to the United States and 35 minutes within Canada. Set up a two by two system to determine what rate was charged to each country.
- 6 The path of a submarine surfacing from a depth of 1600 m is a parabolic path. After three seconds the submarine has rose to a dept to 1450 m. 3 seconds later it rose to a depth of 1299 m. Determine its equation that describes its path and use it to find when the submarine surfaced approximately. Furthermore, use it to find when then submarine reached half of its initial depth.
- 7 A foot ball is kicked from the 45 yard line. When the ball is half the distance to the goal line it was determined the ball was at a height of 20 m. The ball hit the cross bar which is 4 m in the air and bounced off. Find a quadratic function to describe its path.
- 8 Solve algebraically:

$$\begin{cases} \frac{2}{3}x - 9 = \frac{4}{5}y \\ x + \frac{7}{9}y = -2 \end{cases}$$