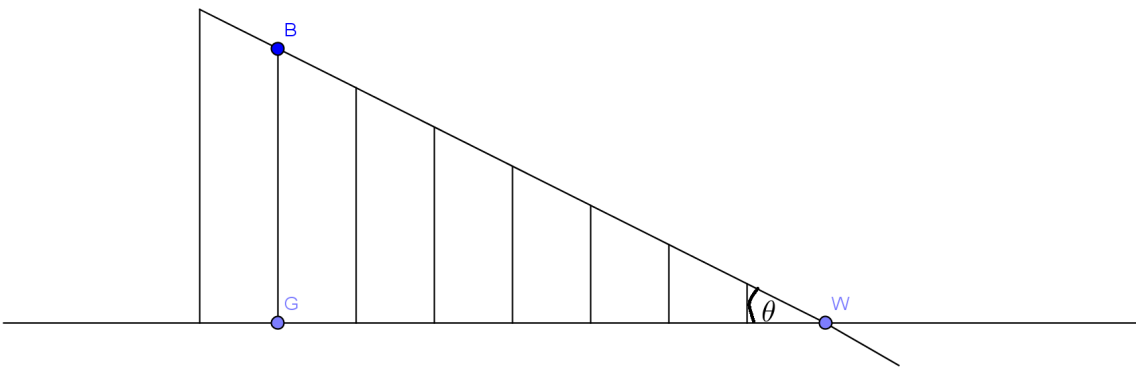


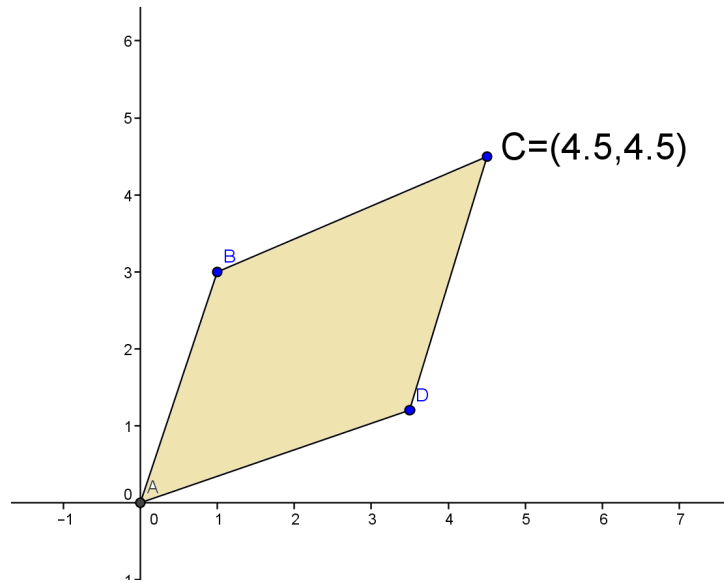
Coordinate Geometry in Context

1. A new lifeboat station is being built. The boat will be held at the point B on the ramp so that the height $|BG|$ is 21 m. The ramp angle, θ , is yet to be decided.



- i. What would the slope of the ramp be for $\theta = 25^\circ$, $\theta = 35^\circ$ and $\theta = 45^\circ$? Where appropriate, round your result to one decimal place and give your answer as a simple fraction.
- ii. Take G as the origin $(0,0)$ and use metres as units. Using your answer from (i), find the equation of the ramp when $\theta = 25^\circ$, $\theta = 35^\circ$ and $\theta = 45^\circ$. Write your answers in the form $y = mx + c$.
- iii. Find the coordinates of W when $\theta = 35^\circ$

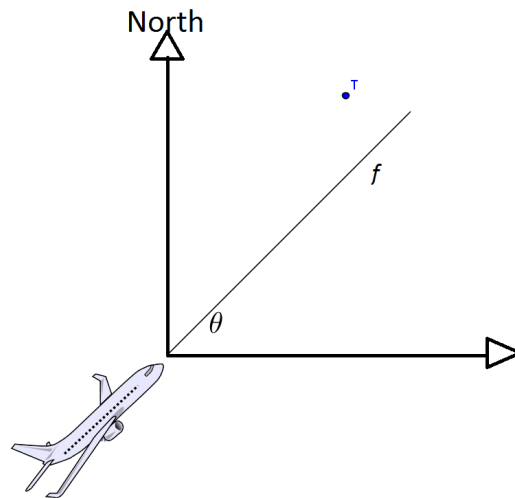
2. One side of a rhombus is the line $y = 2x$ and two opposite vertices are the points $(0,0)$ and $(4.5,4.5)$.



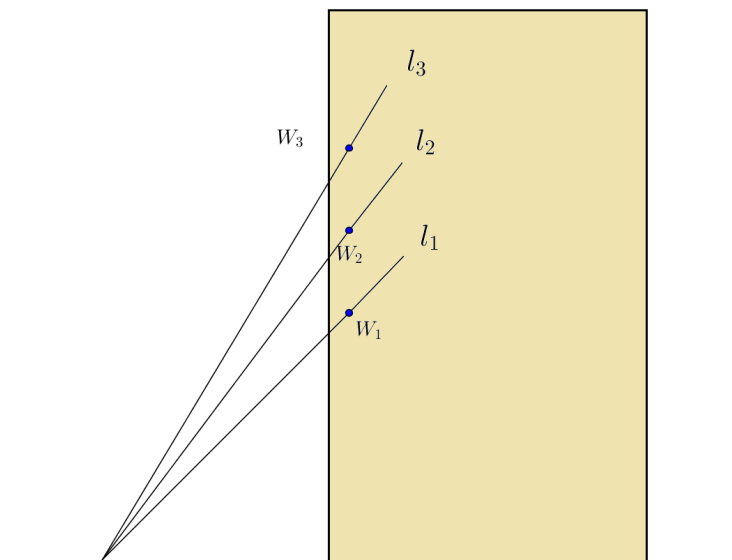
Find:

- i. The equations of the diagonals
- ii. The coordinates of the other two vertices
- iii. The length of a side of the rhombus

3. A plane is flying as shown in the diagram, where $\theta = \tan^{-1} \frac{4}{3}$. Place the plane at the origin and use kilometres as units.



- i. Find the slope of f
 - ii. Find the equation f of the plane's path
 - iii. Calculate how close the plane will pass by a tower, T , located 30 km to the east and 45 km north of its current location.
4. A long ladder is placed on level ground 10 m from the base of a verticle building . When the ladder has a slope of $\frac{4}{5}$ it can reach window W_1 , while at a slope of $\frac{8}{5}$ it can reach window W_3 .



- i. How high are W_1 and W_3 above the ground?
- ii. Using the base of the ladder as the origin and metres as units, find the equations of l_1 and l_3 .

- iii. If the slope of l_2 is the average of the slopes of l_1 and l_3 , will W_2 be the midpoint (average) of W_1 and W_3 ?
 - iv. Find the equation of l_2 and investigate whether it is the average of the equations of l_1 and l_3 .
 - v. Find the angles of the three ladder positions and investigate whether the angle of l_2 is the average of the angles of l_1 and l_3 .
5. Part of an obstacle course is called 'verticle ramp'. If the ramp is on flat ground and its slope is 6, what is the angle of inclination of the ramp?

