

An altitude of a triangle is a line through a vertex.

It is perpendicular to the opposite side but it won't necessarily bisect it.

In engineering, the equation of altitude is used to determine the centre of gravity of a structure.

Triangle ABC has vertices A four, negative five, B five, three and C negative five, two.

Find the equation of the altitude AD.

Start with a sketch.

Calculate the gradient of BC using B and C. $m_{BC} = \frac{y_2 - y_1}{x_2 - x_1}$

This equals $\frac{2 - 3}{-5 - 5}$, which equals $\frac{-1}{-10}$, which is $\frac{1}{10}$.

The gradients of perpendicular lines multiply to give negative one, so the gradient of BC times gradient of AD equals negative one.

The gradient of AD will be negative ten, the negative reciprocal of $\frac{1}{10}$.

Find the equation of the altitude AD using the gradient, negative ten, the point A four and negative five.

Substitute the values into the equation $y - b = m(x - a)$, to get $y - (-5) = -10(x - 4)$, which is $y + 5 = -10x + 40$. Simplify to get $y = -10x + 35$.

Remember, altitudes are the perpendicular line drawn from the vertex of the triangle to the opposite side and don't necessarily bisect.