



Intermediate Math Circles

Analytic Geometry I

Problems

- Three points are *collinear* if they all lie on a straight line. Show that $P(-12, 1)$, $Q(-4, -3)$ and $R(6, -8)$ are collinear.
 - Use a slope argument to show collinearity.
 - Use a distance argument to show collinearity.
- The point $A(-2, y)$ is on a line that passes through the points $T(0, -2)$ and $W(4, 0)$. Determine the value of y .
- $\triangle ABC$ has vertex A on the x -axis at -2 and vertex C on the x -axis at 8 . The third vertex B is on the y -axis at b such that $\angle ABC = 90^\circ$. Determine all possible values of b .
- A point W is located on the x -axis so that it is 13 units from the point $R(7, 5)$. Find the coordinates of point W .
- The points A and B are located in the first quadrant, equidistant from the origin, O . If the slope of OA is 7 and the slope of OB is 1, determine the slope of AB .
- The vertices of $\triangle ABC$ are $A(-2, -11)$, $B(10, 5)$ and $C(12, 3)$.
 - Determine the midpoint M of line segment AB .
 - Show that $AM = MB = MC$. This will prove that M is the centre of a circle containing points A, B and C on the circumference.
 - Show that $\angle ACB = 90^\circ$.
- The line segment AB , where A is $(2, -4)$ and B is $(10, 8)$, is divided at Q in the ratio $3 : 5$. Find the coordinates of Q .

