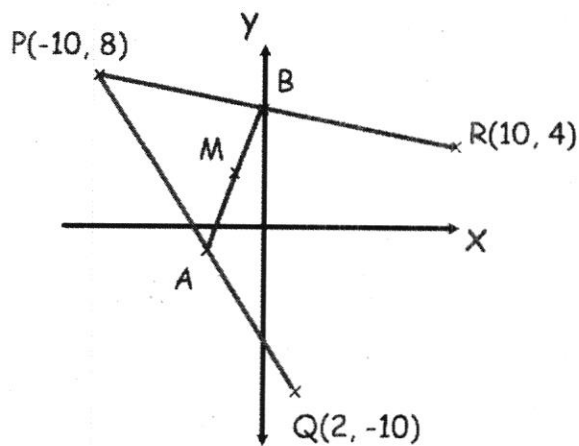


18th July



Corbettmaths



Find the coordinates of the point M

A is the midpoint of the line PQ.  
B is the midpoint of the line PR.  
M is the midpoint of the line AB.

$$A (-4, -1)$$

$$B (0, 6)$$

$$\underline{M (-2, 2.5)}$$

$$A = \begin{pmatrix} 5 & -3 \\ -2 & 7 \end{pmatrix}$$

Work out the matrix  $7A$ 

$$\underline{7A = \begin{pmatrix} 35 & -21 \\ -14 & 49 \end{pmatrix}}$$

Prove  
 $\sin^2 x - 2\cos^2 x \equiv 3\sin^2 x - 2$

$$\begin{aligned} \text{LHS} &= \sin^2 x - 2(1 - \sin^2 x) \\ &= \sin^2 x - 2 + 2\sin^2 x \\ &= \underline{3\sin^2 x - 2} \end{aligned}$$

Hence, work out the values of  $x$   
between  $0^\circ$  and  $360^\circ$  for which

$$\sin^2 x - 2\cos^2 x = 0$$

$$\begin{aligned} \Rightarrow 3\sin^2 x &= 2 \\ \Rightarrow \sin^2 x &= \frac{2}{3} \\ \Rightarrow \sin x &= \pm \sqrt{\frac{2}{3}} \\ \Rightarrow x &= 54.7^\circ, 125.3^\circ, \\ &\quad \underline{234.7^\circ, 305.3^\circ} \end{aligned}$$