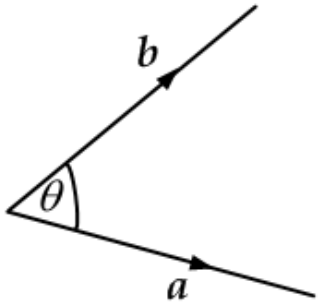
Ross High School: Mathematics Department

Higher Mathematics: Homework 5

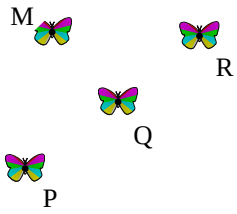
1. The diagram shows vectors ***a*** and ***b***.

If $|a| = 5,\ |b| = 4,$ and $a.(a+b) = 36$, find the size of the acute angle θ between ***a*** and ***b***.



(4)

2. Relative to an origin, three butterflies P, Q and R, on a toy mobile phone, have coordinates P(0, -3, -1), Q(4, -5, 3) and R(6, -6, 5).



(a) Another butterfly, M, is added at the point (*a*, -5, 1) making QM perpendicular to PR.

Calculate the value of *a*. **(5)**

(b) Calculate the size of the angle PMR. **(5)**

3. Find the equation of the line which passes through the point (-1, 5) and is perpendicular to the line with equation $2x + 3y = 1$.

(4)