# Ross High School: Mathematics Department

## Higher Mathematics: Homework 6

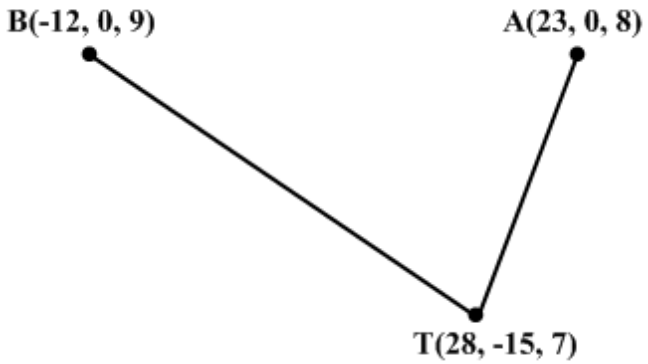
**1.** Solve: $x^2 + 5x + 6 < 0$. **(3)**

**2.** For what value of $k$ does the equation $x^2 - 5x + (k+6) = 0$ have equal roots? **(3)**

**3.** a) Write $f(x) = x^2 + 6x + 11$ in the form $(x + a)^2 + b$. **(2)**

b) Hence or otherwise sketch the graph of $y = f(x)$. **(3)**

**4.** The sketch below shows the positions of Andrew(A), Bob(B) and Tracy(T) on 3 hill-tops. Relative to a suitable origin, the coordinates (in hundreds of metres) of the three people are A(23,0,8), B(–12,0,9) and T(28, –15,7). In the dark, Andrew and Bob locate Tracy using heat-seeking beams.




(a) Express the vectors $\overrightarrow{TA}$ and $\overrightarrow{TB}$ in component form. **(2)**

(b) Calculate the angle between these two beams. **(5)**