CfE Higher Homework 6

1 Find the x-coordinate of the point where the graph of the curve with equation $y = \log_3(x-2) + 1$ intersects the x-axis. 3

2 (*a*) Express $f(x) = x^2 - 4x + 5$ in the form $f(x) = (x-a)^2 + b$. 2

(*b*) On the same diagram sketch:

(i) the graph of $y = f(x)$;

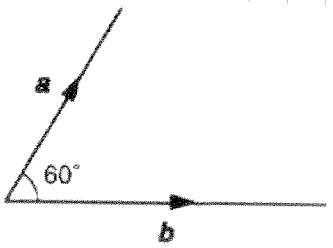
(ii) the graph of $y = 10 - f(x)$. 4

(*c*) Find the range of values of x for which $10 - f(x)$ is positive. 1

3 A is the point (2, –5, 6), B is (6, –3, 4) and C is (12, 0, 1). Show that A, B and C are collinear and determine the ratio in which B divides AC. 4

4 The diagram shows representatives of two vectors, a and b, inclined at an angle of 60°.

If $|a| = 2$ and $|b| = 3$, evaluate $a.(a + b)$ 3



5 The diagram shows a sketch of part of the graph of $y = \log_5 x$.

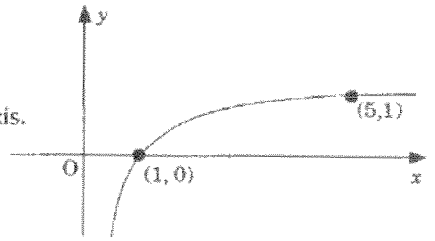
(*a*) Make a copy of the graph of $y = \log_5 x$.

On your copy, sketch the graph of $y = \log_5 x + 1$.

Find the coordinates of the point where it crosses the x-axis. 3

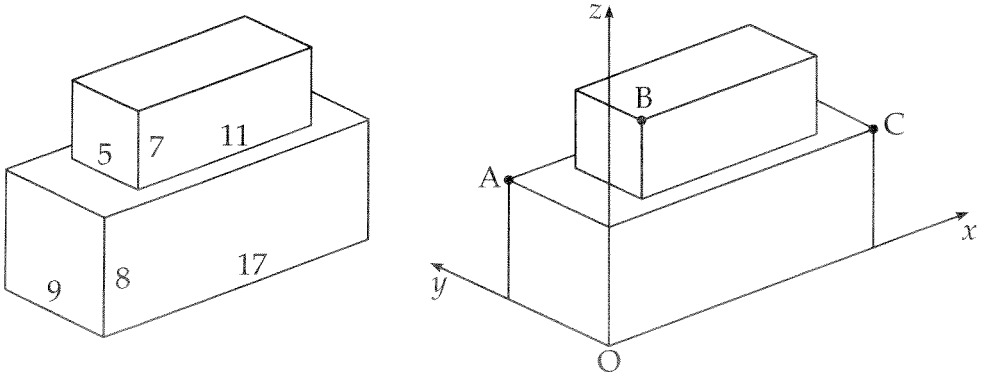
(*b*) Make a second copy of the graph of $y = \log_5 x$.

On your copy, sketch the graph of $y = \log_5 \frac{1}{x}$. 2



6 A cuboid measuring 11 cm by 5 cm by 7 cm is placed centrally on top of another cuboid measuring 17 cm by 9 cm by 8 cm.

Coordinates axes are taken as shown.



(*a*) The point A has coordinates $(0, 9, 8)$ and C has coordinates $(17, 0, 8)$.

Write down the coordinates of B. 1

(*b*) Calculate the size of angle ABC. 6