Four Maths Questions at Different Levels – Question Set 4

Easy higher tier GCSE

The points A, B, C and D lie in order on a straight line.

$$AB:BD = 1:5$$
$$AC:CD = 7:11$$

Work out $AB:BC:CD$

Harder higher tier GCSE

(a) Simplify $\dfrac{x^2 - 16}{2x^2 - 5x - 12}$

(b) Make v the subject of the formula

$$w = \frac{15(t - 2v)}{v}$$

Something interesting

$$x^2 + x + 41$$

Is this a prime number for all natural numbers x?

The answer is no, but can you find an example to prove this?

A Level

Point A has position vector $\begin{pmatrix} a \\ b \\ 0 \end{pmatrix}$ where a and b can vary, point B has position vector $\begin{pmatrix} 4 \\ 2 \\ 0 \end{pmatrix}$

and point C has position vector $\begin{pmatrix} 2 \\ 4 \\ 2 \end{pmatrix}$. ABC is an isosceles triangle with AC = AB.

(i) Show that $a - b + 1 = 0$.

(ii) Determine the position vector of A such that triangle ABC has minimum area.

Answers at www.colmanweb/easter2020

Four Maths Questions at Different Levels – Answers Set 4

Easy higher tier GCSE

The points A, B, C and D lie in order on a straight line.

$$AB:BD = 1:5$$
$$AC:CD = 7:11$$

Work out $AB:BC:CD$

$$3:4:11$$

Harder higher tier GCSE

(a) Simplify $\dfrac{x^2 - 16}{2x^2 - 5x - 12}$ $\qquad \dfrac{x + 4}{2x + 3}$

(b) Make v the subject of the formula

$$w = \frac{15(t - 2v)}{v}$$

$$v = \frac{15t}{w + 30}$$

Something interesting

$$x^2 + x + 41$$

Is this a prime number for all natural numbers x?

The answer is no, but can you find an example to prove this?

Try $x = 41$

A Level

Point A has position vector $\begin{pmatrix} a \\ b \\ 0 \end{pmatrix}$ where a and b can vary, point B has position vector $\begin{pmatrix} 4 \\ 2 \\ 0 \end{pmatrix}$

and point C has position vector $\begin{pmatrix} 2 \\ 4 \\ 2 \end{pmatrix}$. ABC is an isosceles triangle with AC = AB.

(i) Show that $a - b + 1 = 0$.

(ii) Determine the position vector of A such that triangle ABC has minimum area.

$$\begin{pmatrix} 2.5 \\ 3.5 \\ 0 \end{pmatrix}$$