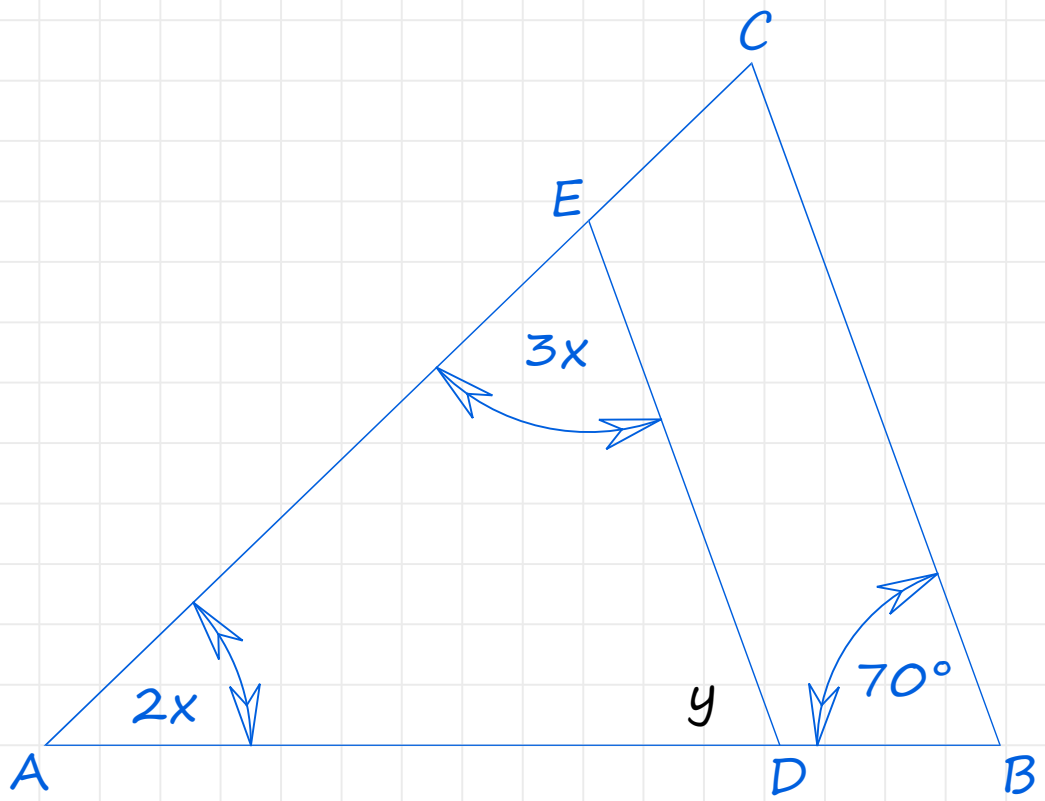
Question 7

The diagram show the triangle ABC. DE is parallel to BC. The sizes of some of the angles are shown.



a) Find the value of x.

Use y to index the blank angle in the smaller triangle, i.e.: $\angle EDA$. Now we can create an equation because we know that the three angles in any triangle sum to 180°. So:

$$2x+3x+y = 180°$$
$$5x+y = 180°$$

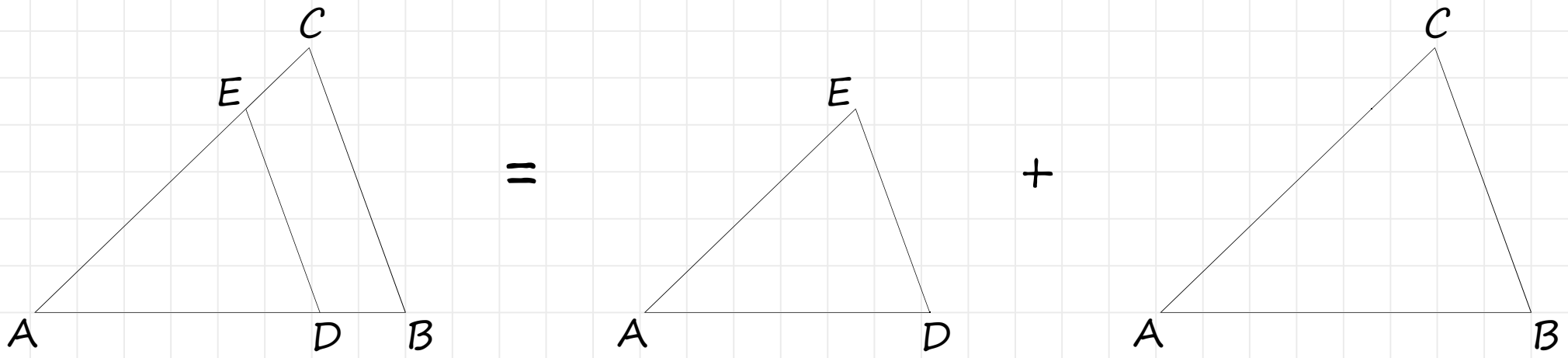
DRAWN BY : PKIRWAN

But $y=70°$ - corresponding angles so:

$$5x+70° = 180°$$
$$5x = 110°$$
$$x = 22°$$

a) Given that $|AE| = 100$, $|AC| = 130$, and $|DE| = 74$, find the value of $|BC|$.

The triangles ADE and ABC are similar triangles so all corresponding sides are scaled by the same factor. We will seperate the triangles so that it is easy to see the which sides correspond to each other.



We can see that:

AE corresponds to AC,
AD corresponds to AB and
ED corresponds to BC.

DRAWN BY : PKIRWAN

In this case we will assume that $\triangle ADE$ is scaled up to produce $\triangle ABC$. This means that the scale factor can be found by dividing $|AC|$ by $|AE|$.

$$\text{Scale Factor} = \frac{|AC|}{|AE|} = \frac{130}{100} = 1{\cdot}3$$

Now this scale factor can be applied to $|DE|$ to find the length of $|BC|$

$$|BC| = |DE| \times 1{\cdot}3$$
$$= 74 \times 1{\cdot}3$$
$$= 96{\cdot}2$$

Alternatively:

$$\frac{|AC|}{|AE|} = \frac{|BC|}{|DE|}$$

$$|BC| = \frac{|AC| \times |DE|}{|AE|} = \frac{130 \times 74}{100} = 96{\cdot}2$$

DRAWN BY : PKIRWAN