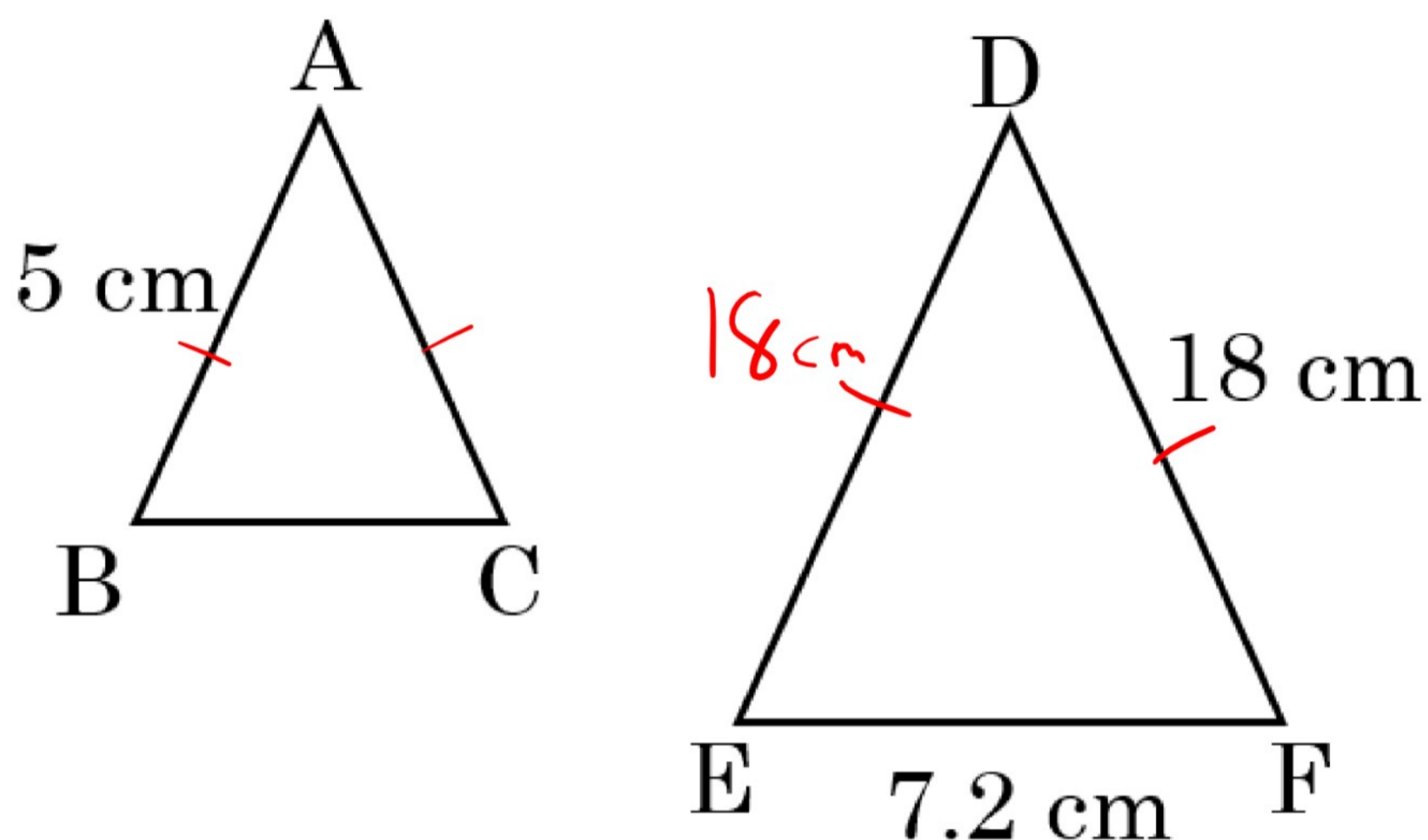Q1. The two isosceles triangles shown below are both similar.



Find the perimeter of triangle ABC.

$$\frac{BC}{7\cdot2} = \frac{5}{18}$$

$$BC = \frac{5 \times 7\cdot2}{18}$$
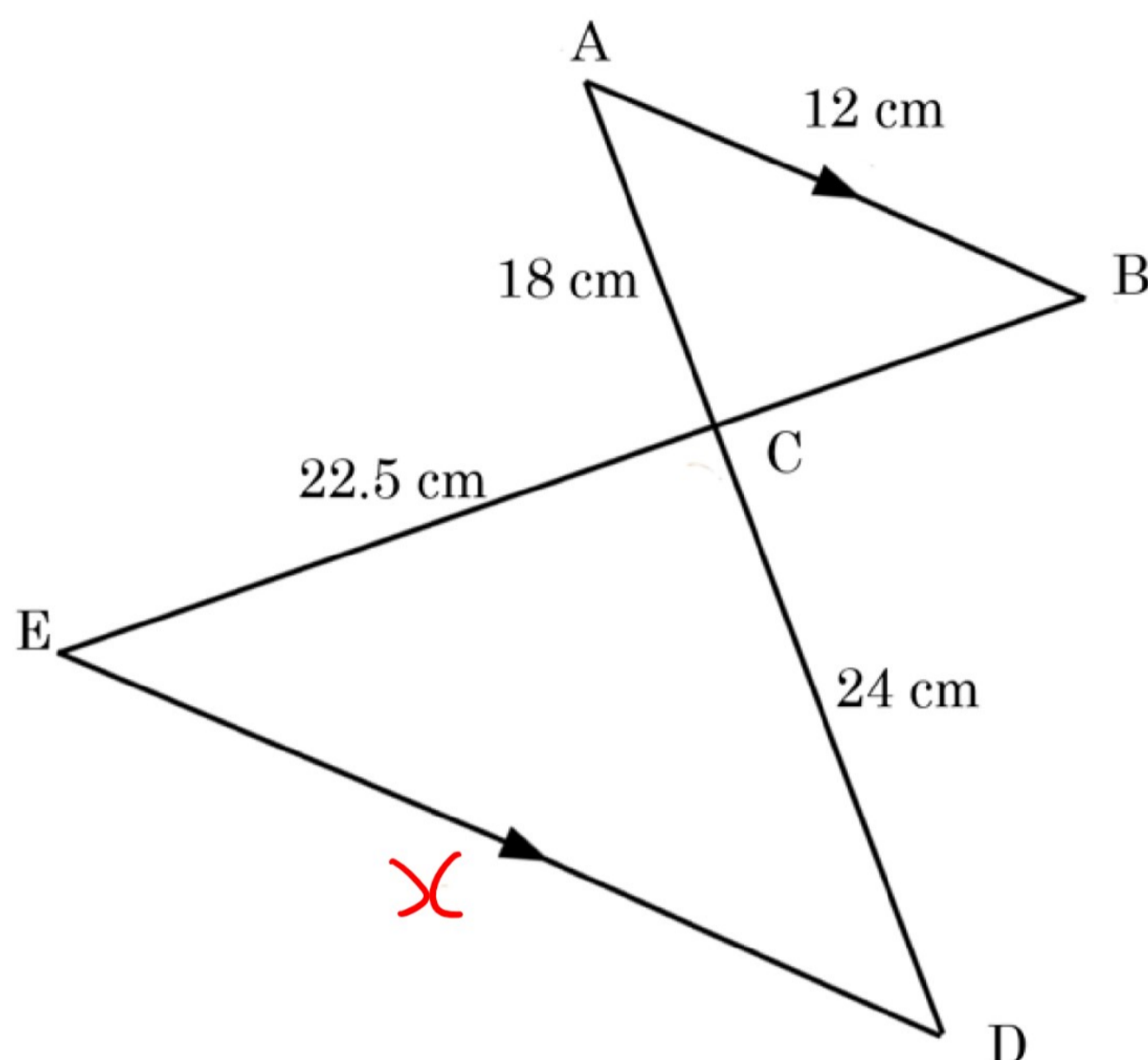
$$BC = 2$$

perimeter $= 5 + 5 + 2$

$= 12$

Answer: _12 cm_

(2 marks)

Q2. Below, triangles ABC and CDE are similar.



a) Find length DE

$$\frac{24}{18} = \frac{x}{12}$$

$$\Rightarrow x = 16$$

Answer: __16 cm__

(2 marks)

b) Find the perimeter of shape ABCDE

$$\frac{CB}{22.5} = \frac{18}{24}$$

$$\Rightarrow CB = 16.875$$

$$\Rightarrow 12 + 18 + 16.875 + 16 + 22.5 + 24$$
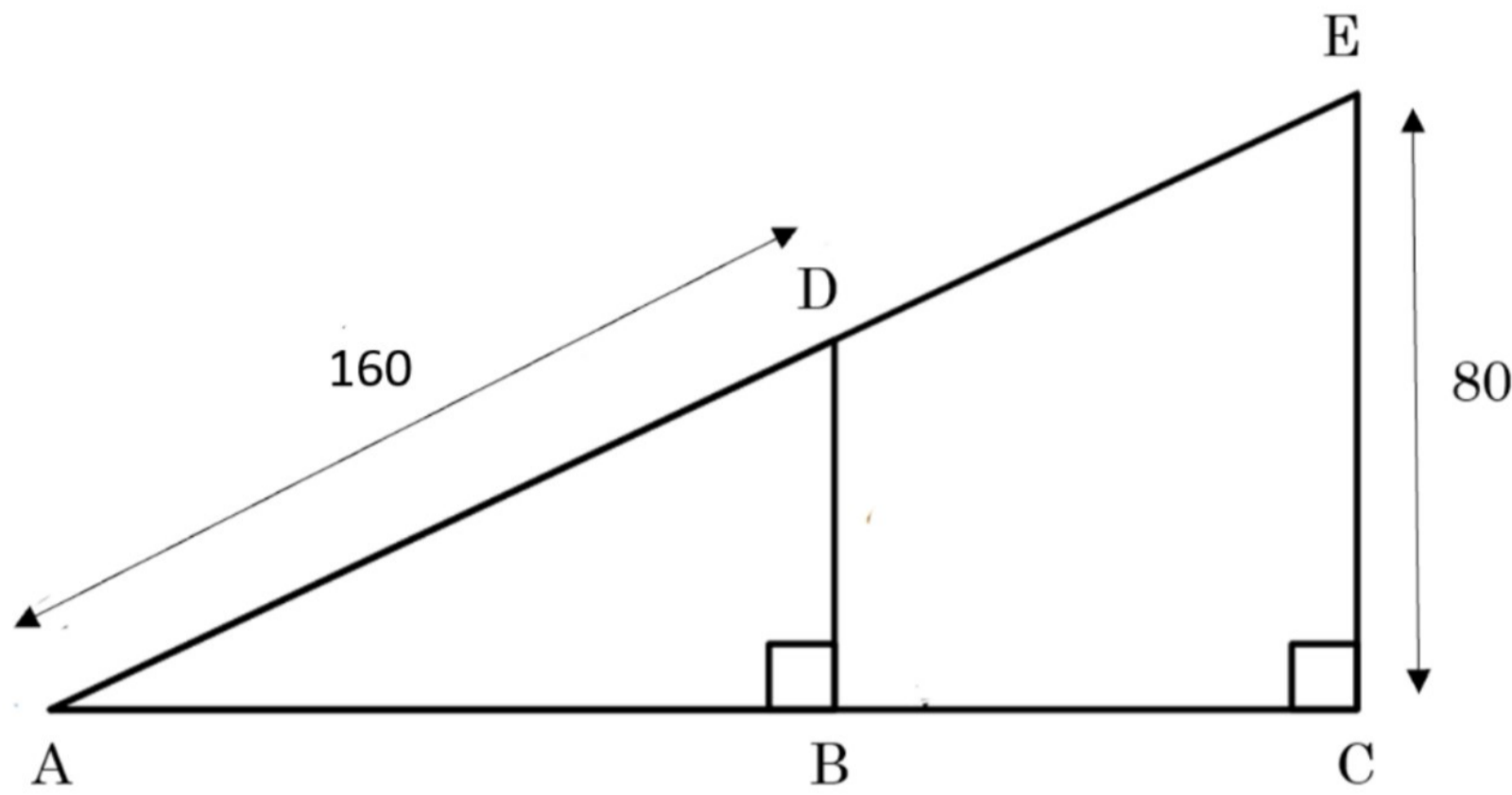$$= 109.375$$

Answer: __109.4 cm__

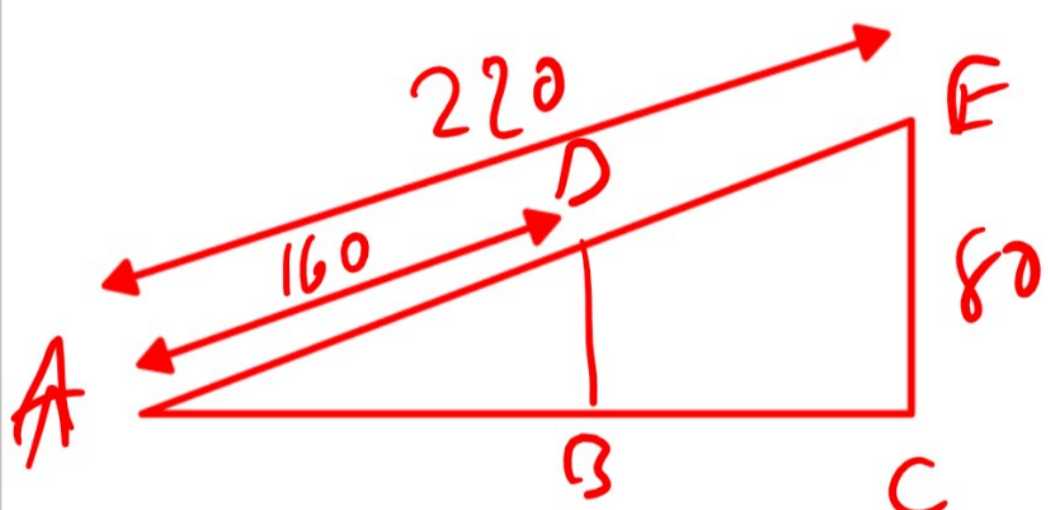(3 marks)

Q3. Below AD to AE is in the ratio 8:11



a) Find DB

$$AD : AE$$
$$8 : 11$$
$$\times 20 \left( \begin{matrix} 160 : 220 \end{matrix} \right) \times 20$$



$$\Rightarrow \frac{DB}{80} = \frac{160}{220}$$

$$\Rightarrow DB = 58.1\ddot{8}$$

Answer: _____58.2_____
(3 marks)

$$\frac{DB}{80} = \frac{42}{73.5}$$

$$DB = 45.7$$
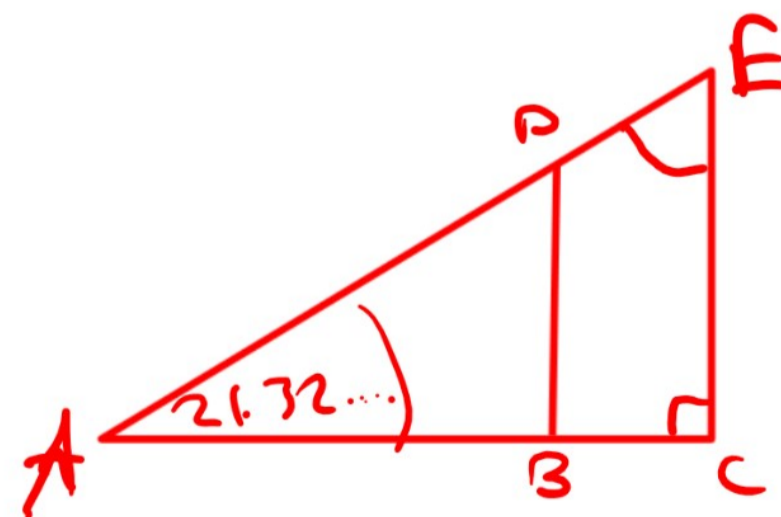
b) Find angle AEC

$$\cdot \quad C\hat{A}E = \sin^{-1}\left(\frac{DB}{18}\right)$$

$$= \sin^{-1}\left(\frac{58.1\ddot{8}}{160}\right)$$

$$= 21.32\ldots$$
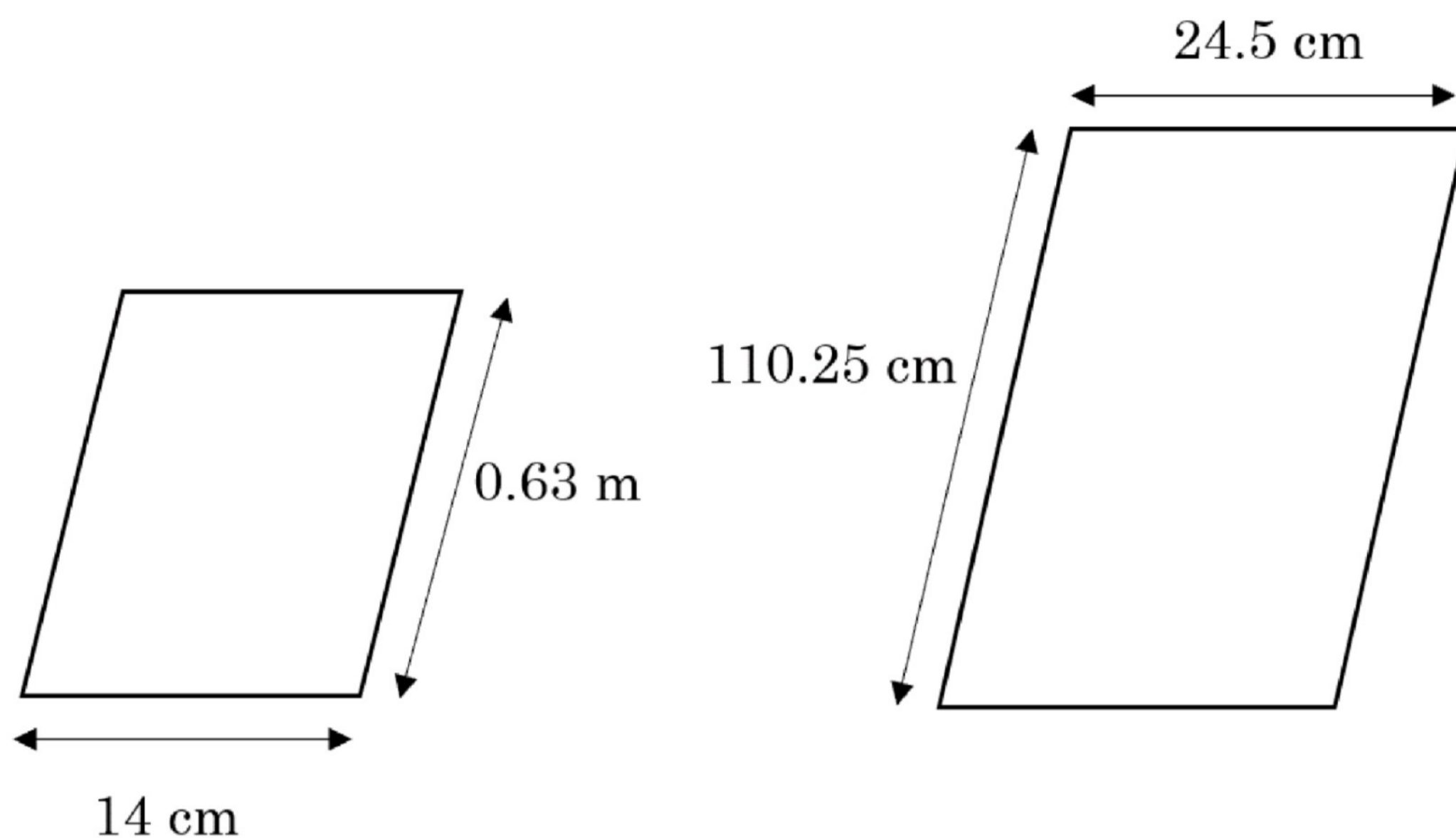


$$\cdot \quad AEC = 180 - 90 - 21.32$$
$$= 68.67\ldots$$

Answer: _____68.7°_____
(3 marks)

Q4. Below are 2 parallelograms. Decide if they are similar or not.
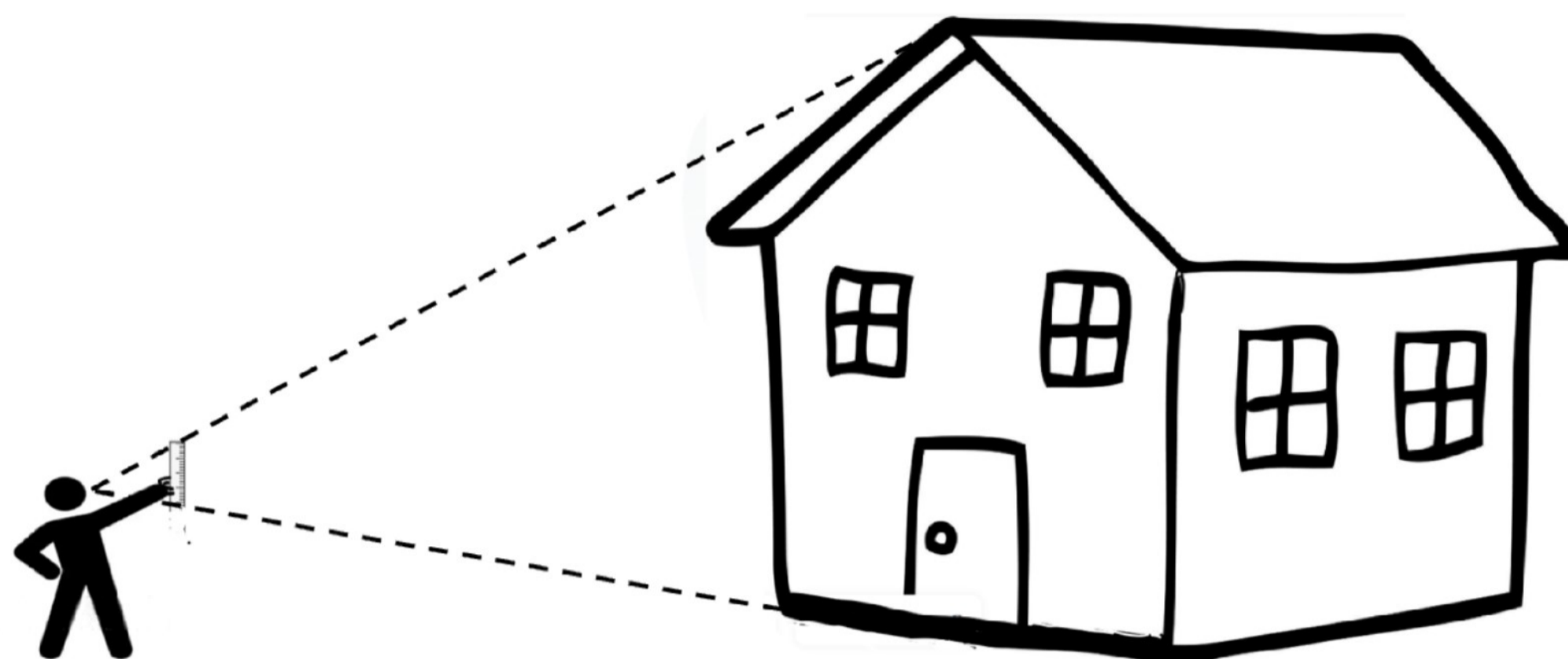You must show your reasoning carefully.

24.5 cm

110.25 cm

0.63 m

14 cm

$$\frac{110.25}{63} = 1.75$$

$$\frac{24.5}{14} = 1.75$$

Corresponding sides are in the same ratio

∴ The 2 shapes are similar.

Answer: _Similar_

(3 marks)

**Q5.** Bill estimates the height of his house by holding a ruler vertically so that the height of the house is exactly covered by the ruler:
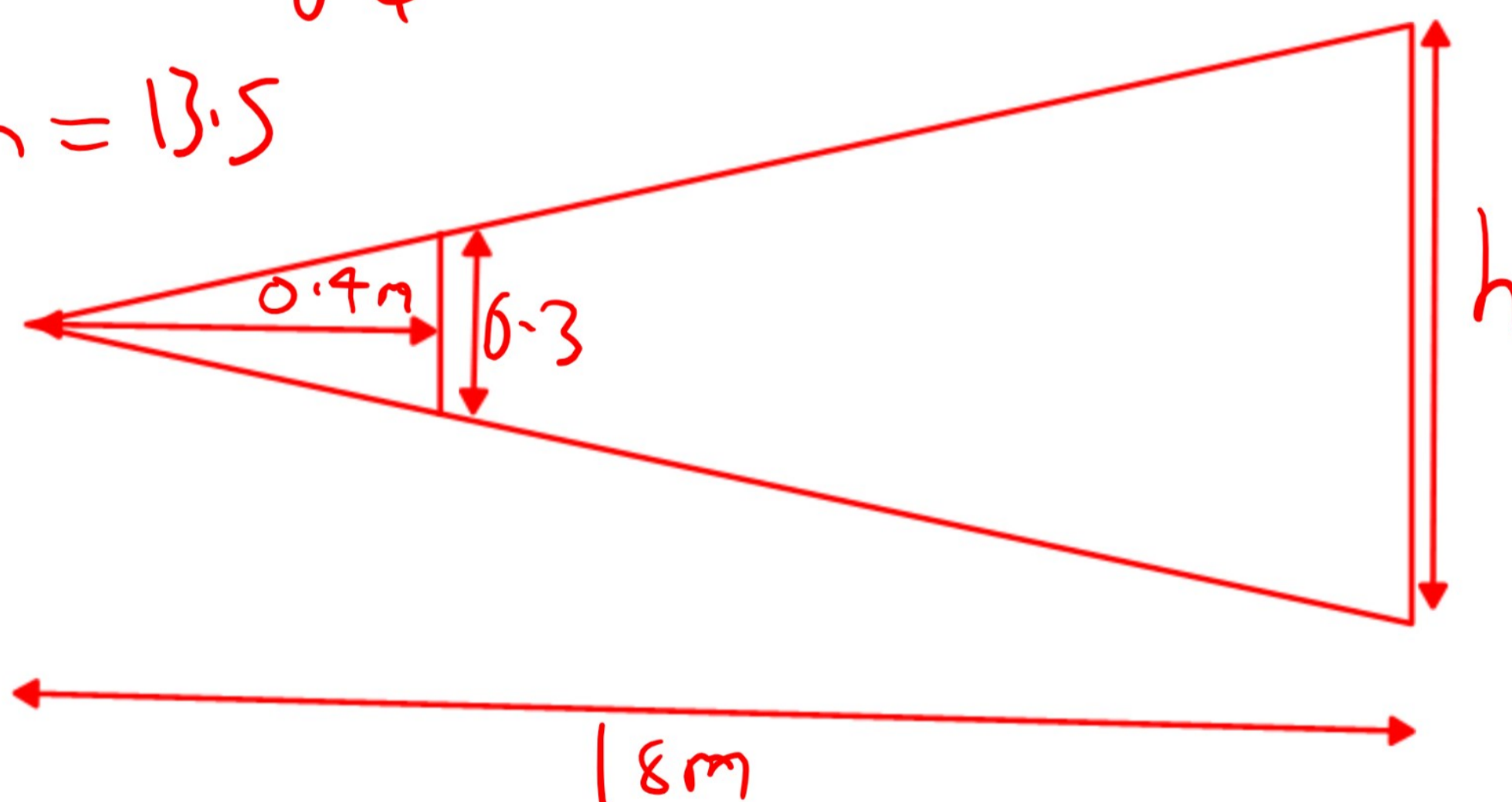


Bill stands 18 m from his house, and the distance from his eyes to the ruler is 40 cm. The ruler he uses is 30 cm long. Work out an estimate for the height of his house in meters.

$$\frac{h}{0.3} = \frac{18}{0.4}$$

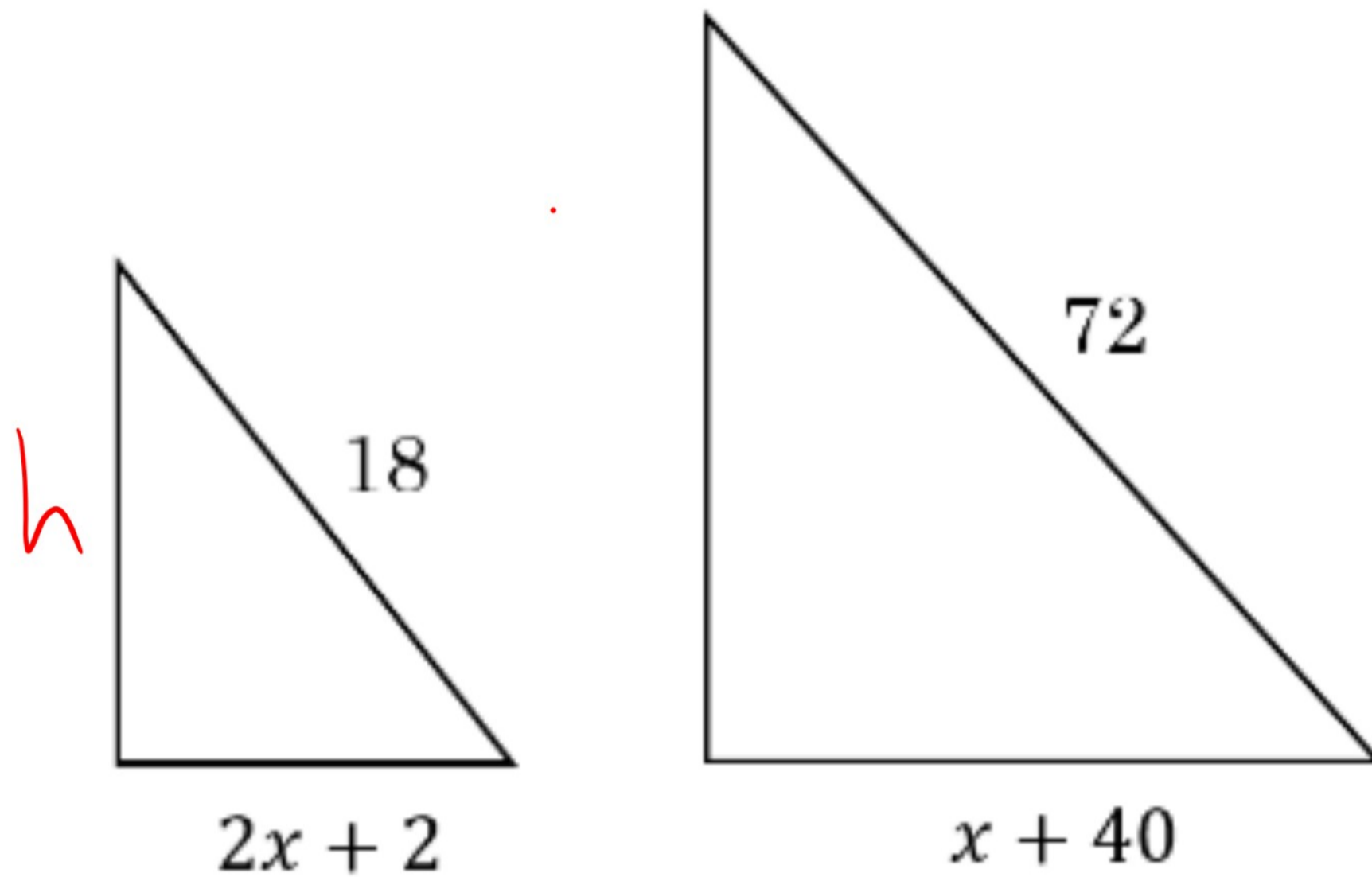$$h = \frac{18 \times 0.3}{0.4}$$

$$h = 13.5$$



Answer: 13.5m

(3 marks)

Q6. The two triangles below are similar.



a) Find the exact value of x    $\dfrac{72}{18} = \dfrac{x+40}{2x+2}$

$144x + 144 = 18(x+40)$

$144x + 144 = 18x + 720$

$126x = 576$

$x = \dfrac{576}{126}$

Answer: $\dfrac{32}{7}$

(3 marks)

b) Find the area of the small triangle to 1 d.p.

• Area $= \frac{1}{2} \times b \times h$   where by Pythagoras:

• $b = 2\left(\dfrac{32}{7}\right)+2$

$b = \dfrac{78}{7}$

$h = \sqrt{18^2 - \left(\dfrac{78}{7}\right)^2}$

$\approx 14.136$

Area $= \frac{1}{2}\left(\dfrac{78}{7}\right)(14.136..)$

$= 78.75...$

Answer: $78.8 \text{ cm}^2$

(3 marks)

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Q7. Below are two similar shapes. The perimeter of the large shape is 50% more than the perimeter of the smaller shape. Find the length of $x$



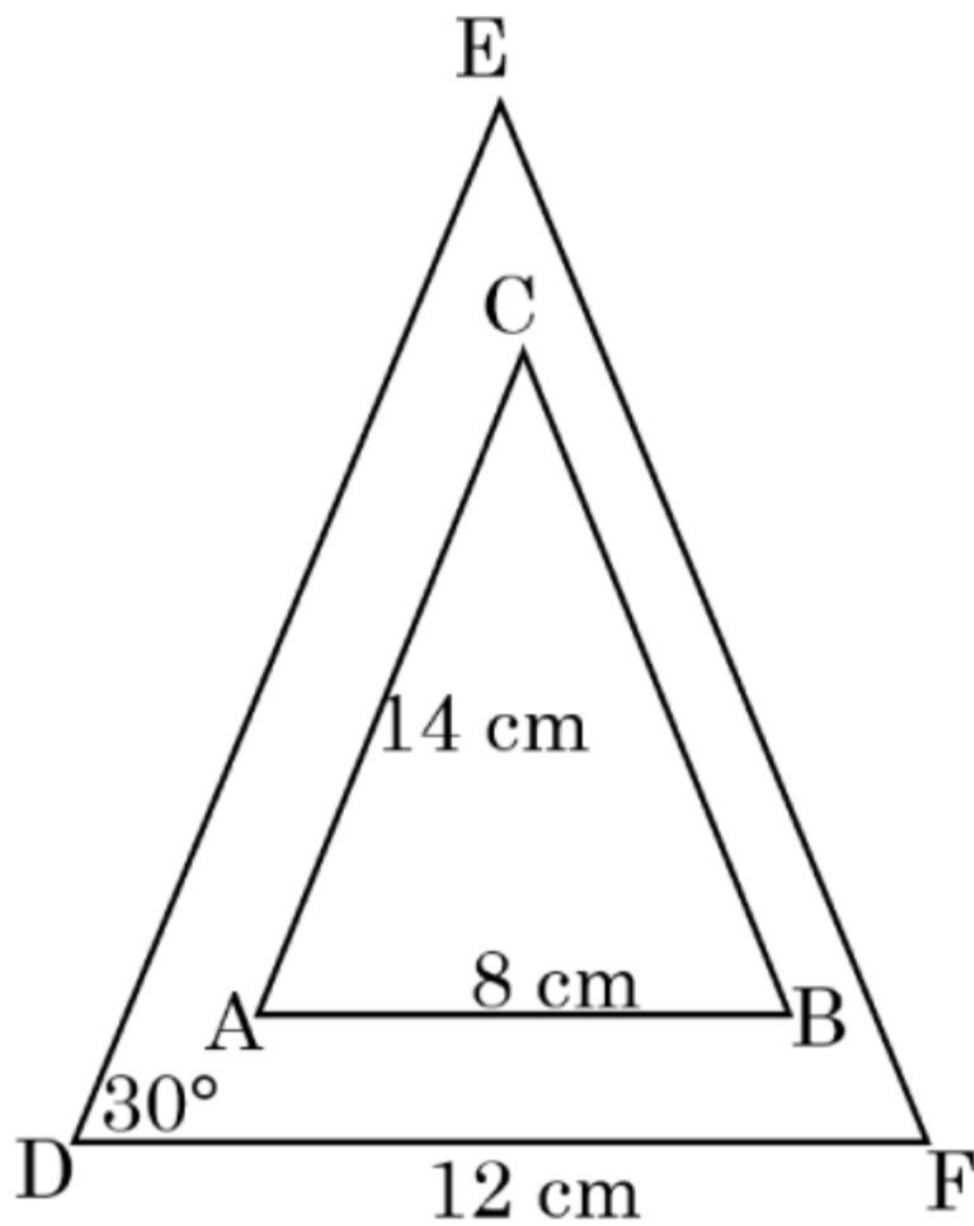15 cm                     x cm
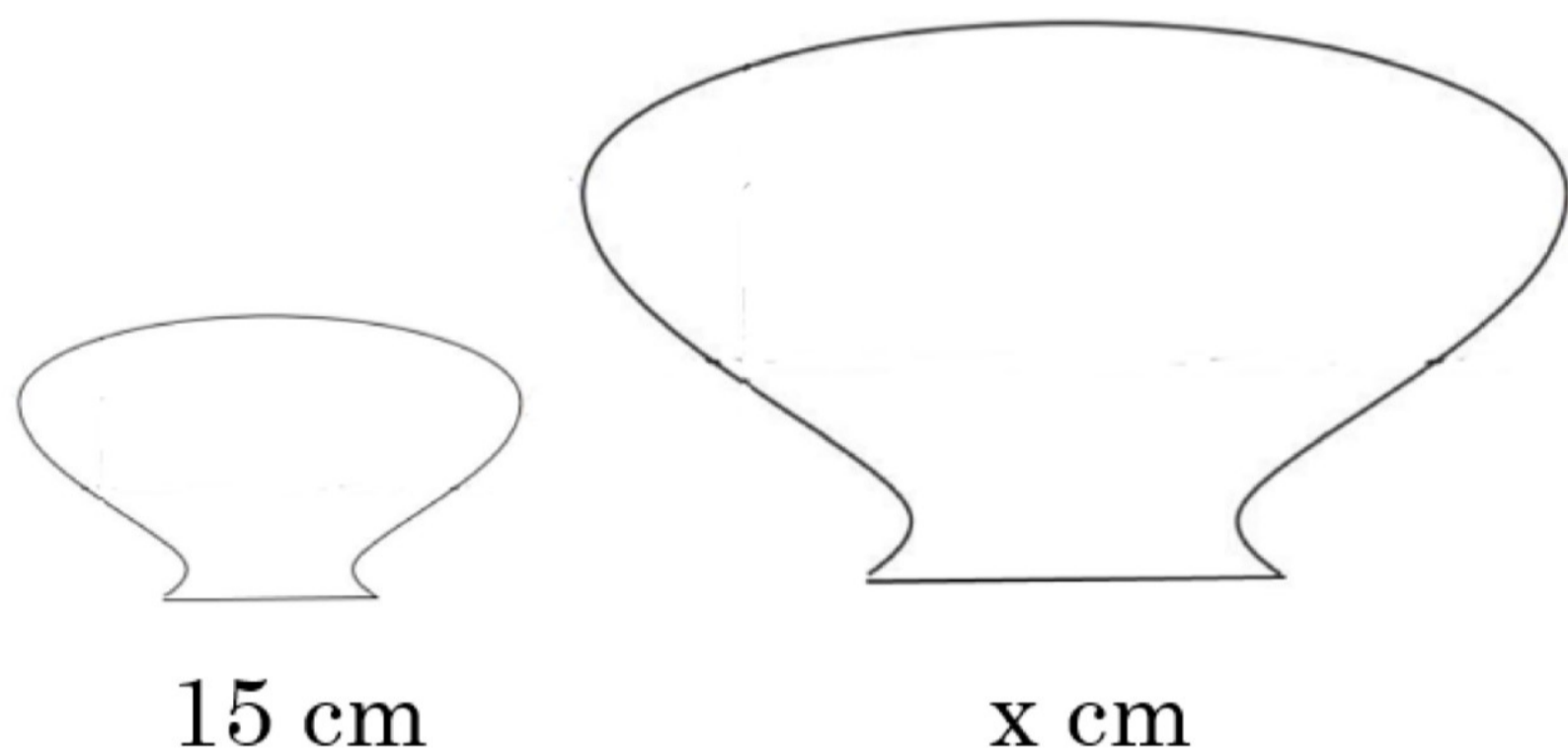
$$x = 15 \times 1.5$$

$$x = 22.5 \, cm$$

Answer: 22.5cm

(3 marks)

Q8. Below, DEF is 30°, AB = 14cm, AC = 14cm, and DF = 12 cm.

E

C

14 cm

8 cm

A        B

30°

D        12 cm        F
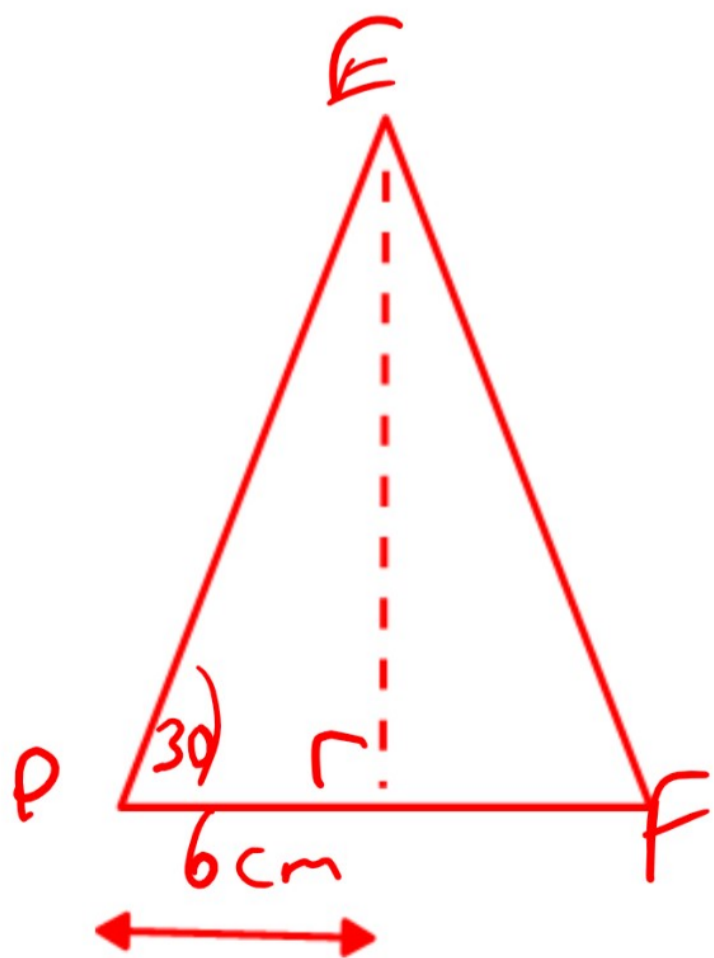
Determine if ABC is similar to DEF. You must show your working.

- from ABC : $\dfrac{14}{8} = 1.75$

- we check if $\dfrac{DE}{12} = 1.75$

E

P  30  r

6cm  F

$\cos(30) = \dfrac{6}{DE}$

$\dfrac{\sqrt{3}}{2} = \dfrac{6}{DE}$

$\Rightarrow DE = 4\sqrt{3}$

- $\dfrac{DE}{12} \neq 1.75$

So ABC is not similar to DEF

Answer: _____ NO _____

(3 marks)

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