



Using the Sine Rule to find missing sides

Mana Maths

Start Tasks

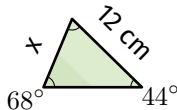


Match each side to its opposite angle, then use the Sine Rule to find x (1 d.p.).

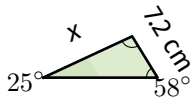
1.



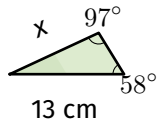
2.



3.



4.

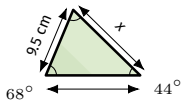


Start Tasks — Answers



Find x in each triangle: match each side with its opposite angle, then use the Sine Rule. Give each missing side to 1 decimal place.

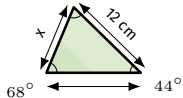
1.



Solution

$$\frac{x}{\sin 68^\circ} = \frac{9.5}{\sin 44^\circ}$$
$$x = \frac{9.5 \sin 68^\circ}{\sin 44^\circ}$$
$$x = 12.7 \text{ cm}$$

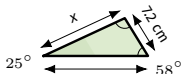
2.



Solution

$$\frac{x}{\sin 44^\circ} = \frac{12}{\sin 68^\circ}$$
$$x = \frac{12 \sin 44^\circ}{\sin 68^\circ}$$
$$x = 9.0 \text{ cm}$$

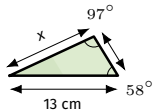
3.



Solution

$$\frac{x}{\sin 58^\circ} = \frac{12}{\sin 25^\circ}$$
$$x = \frac{12 \sin 58^\circ}{\sin 25^\circ}$$
$$x = 14.4 \text{ cm}$$

4.



Solution

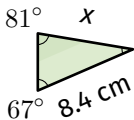
$$\frac{x}{\sin 58^\circ} = \frac{13}{\sin 97^\circ}$$
$$x = \frac{13 \sin 58^\circ}{\sin 97^\circ}$$
$$x = 11.1 \text{ cm}$$

Start Tasks

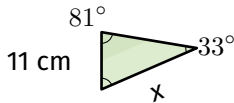


Write the known opposite pair first, then rearrange the Sine Rule to find x .

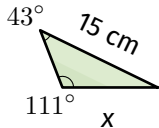
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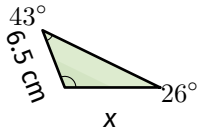
6.



7.



8.

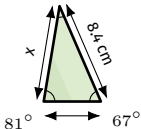


Start Tasks — Answers



Find x in each triangle. Write the known opposite pair first, then rearrange the Sine Rule before calculating.

5.



Solution

$$\frac{x}{\sin 67^\circ} = \frac{8.4}{\sin 81^\circ}$$
$$x = \frac{8.4 \sin 67^\circ}{\sin 81^\circ}$$
$$x = 7.8 \text{ cm}$$

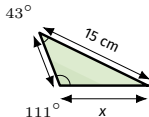
6.



Solution

$$\frac{x}{\sin 81^\circ} = \frac{11}{\sin 33^\circ}$$
$$x = \frac{11 \sin 81^\circ}{\sin 33^\circ}$$
$$x = 19.9 \text{ cm}$$

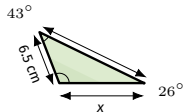
7.



Solution

$$\frac{x}{\sin 43^\circ} = \frac{15}{\sin 111^\circ}$$
$$x = \frac{15 \sin 43^\circ}{\sin 111^\circ}$$
$$x = 11.0 \text{ cm}$$

8.



Solution

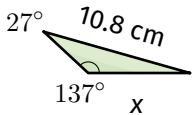
$$\frac{x}{\sin 43^\circ} = \frac{6.5}{\sin 26^\circ}$$
$$x = \frac{6.5 \sin 43^\circ}{\sin 26^\circ}$$
$$x = 10.1 \text{ cm}$$

Start Tasks

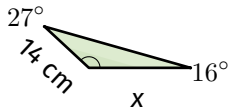


Find x ; check the larger side is opposite the larger angle. Round the final answer only.

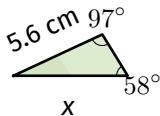
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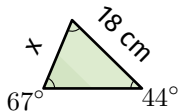
10.



11.



12.

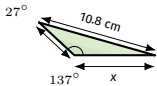


Start Tasks — Answers



Find x in each triangle. Check that the larger side is opposite the larger angle, and round only your final answer.

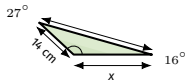
9.



Solution

$$\frac{x}{\sin 27^\circ} = \frac{10.8}{\sin 137^\circ}$$
$$x = \frac{10.8 \sin 27^\circ}{\sin 137^\circ}$$
$$x = 7.2 \text{ cm}$$

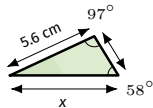
10.



Solution

$$\frac{x}{\sin 27^\circ} = \frac{14}{\sin 16^\circ}$$
$$x = \frac{14 \sin 27^\circ}{\sin 16^\circ}$$
$$x = 23.1 \text{ cm}$$

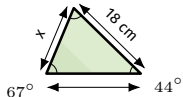
11.



Solution

$$\frac{x}{\sin 97^\circ} = \frac{5.6}{\sin 58^\circ}$$
$$x = \frac{5.6 \sin 97^\circ}{\sin 58^\circ}$$
$$x = 6.6 \text{ cm}$$

12.



Solution

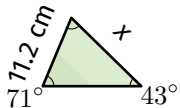
$$\frac{x}{\sin 44^\circ} = \frac{18}{\sin 67^\circ}$$
$$x = \frac{18 \sin 44^\circ}{\sin 67^\circ}$$
$$x = 13.6 \text{ cm}$$

Build Tasks

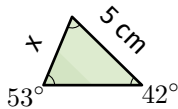


Choose the complete opposite pair, then find each missing side x to 1 d.p.

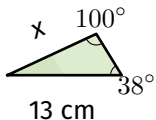
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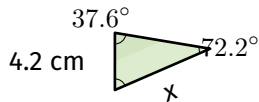
2.



3.



4.

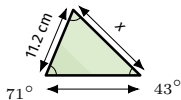


Build Tasks — Answers



Find x in each triangle: choose the complete opposite pair, then give each missing side to 1 decimal place.

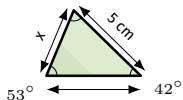
1.



Solution

$$\frac{x}{\sin 71^\circ} = \frac{11.2}{\sin 43^\circ}$$
$$x = \frac{11.2 \sin 71^\circ}{\sin 43^\circ}$$
$$x = 15.5 \text{ cm}$$

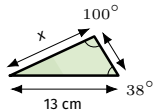
2.



Solution

$$\frac{x}{\sin 42^\circ} = \frac{5}{\sin 53^\circ}$$
$$x = \frac{5 \sin 42^\circ}{\sin 53^\circ}$$
$$x = 4.2 \text{ cm}$$

3.



Solution

$$\frac{x}{\sin 38^\circ} = \frac{13}{\sin 100^\circ}$$
$$x = \frac{13 \sin 38^\circ}{\sin 100^\circ}$$
$$x = 8.1 \text{ cm}$$

4.



Solution

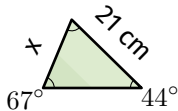
$$\frac{x}{\sin 37.6^\circ} = \frac{4.2}{\sin 72.2^\circ}$$
$$x = \frac{4.2 \sin 37.6^\circ}{\sin 72.2^\circ}$$
$$x = 2.7 \text{ cm}$$

Build Tasks

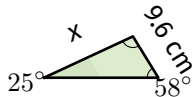


Find x : show the substitution line; keep full calculator values until the final rounding.

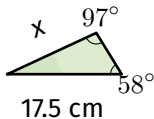
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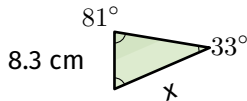
6.



7.



8.

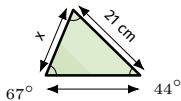


Build Tasks — Answers



Find x in each triangle. Show the substitution line and use full calculator values until the final rounding step.

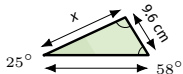
5.



Solution

$$\frac{x}{\sin 44^\circ} = \frac{21}{\sin 67^\circ}$$
$$x = \frac{21 \sin 44^\circ}{\sin 67^\circ}$$
$$x = 15.8 \text{ cm}$$

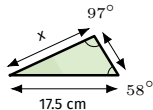
6.



Solution

$$\frac{x}{\sin 58^\circ} = \frac{9.6}{\sin 25^\circ}$$
$$x = \frac{9.6 \sin 58^\circ}{\sin 25^\circ}$$
$$x = 19.3 \text{ cm}$$

7.



Solution

$$\frac{x}{\sin 58^\circ} = \frac{17.5}{\sin 97^\circ}$$
$$x = \frac{17.5 \sin 58^\circ}{\sin 97^\circ}$$
$$x = 15.0 \text{ cm}$$

8.



Solution

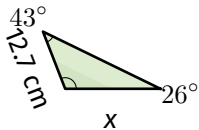
$$\frac{x}{\sin 81^\circ} = \frac{8.3}{\sin 33^\circ}$$
$$x = \frac{8.3 \sin 81^\circ}{\sin 33^\circ}$$
$$x = 15.1 \text{ cm}$$

Build Tasks

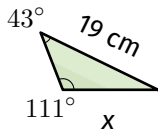


Find x from the diagram's angles; include units and an accuracy statement.

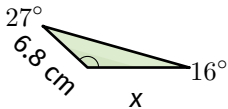
9.



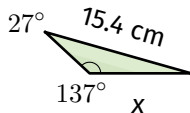
10.



11.



12.

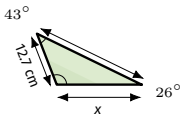


Build Tasks — Answers



Find x in each triangle using the angle information in the diagram; include units and an accuracy statement.

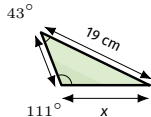
9.



Solution

$$\frac{x}{\sin 43^\circ} = \frac{12.7}{\sin 26^\circ}$$
$$x = \frac{12.7 \sin 43^\circ}{\sin 26^\circ}$$
$$x = 19.8 \text{ cm}$$

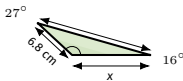
10.



Solution

$$\frac{x}{\sin 43^\circ} = \frac{19}{\sin 111^\circ}$$
$$x = \frac{19 \sin 43^\circ}{\sin 111^\circ}$$
$$x = 13.9 \text{ cm}$$

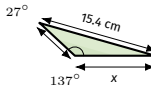
11.



Solution

$$\frac{x}{\sin 27^\circ} = \frac{6.8}{\sin 16^\circ}$$
$$x = \frac{6.8 \sin 27^\circ}{\sin 16^\circ}$$
$$x = 11.2 \text{ cm}$$

12.



Solution

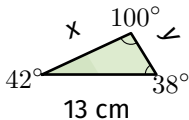
$$\frac{x}{\sin 27^\circ} = \frac{15.4}{\sin 137^\circ}$$
$$x = \frac{15.4 \sin 27^\circ}{\sin 137^\circ}$$
$$x = 10.3 \text{ cm}$$

Push Tasks

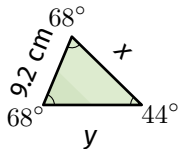


Find x , y , then the perimeter. Give every length to 1 d.p.

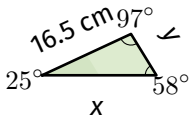
1.



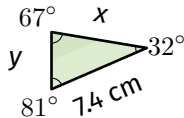
2.



3.



4.

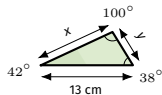


Push Tasks — Answers



For each triangle, find x , y , then the perimeter. Use the Sine Rule efficiently and give every length to 1 decimal place.

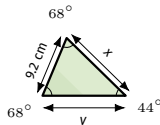
1.



Solution

$$x = 13 \frac{\sin 38^\circ}{\sin 100^\circ} = 8.1$$
$$y = 13 \frac{\sin 42^\circ}{\sin 100^\circ} = 8.8$$
$$P = 30.0 \text{ cm}$$

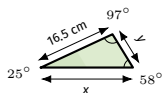
2.



Solution

$$x = 9.2 \frac{\sin 68^\circ}{\sin 44^\circ} = 12.3$$
$$y = 9.2 \frac{\sin 68^\circ}{\sin 44^\circ} = 12.3$$
$$P = 33.8 \text{ cm}$$

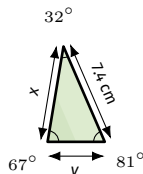
3.



Solution

$$x = 16.5 \frac{\sin 97^\circ}{\sin 58^\circ} = 19.3$$
$$y = 16.5 \frac{\sin 25^\circ}{\sin 58^\circ} = 8.2$$
$$P = 44.0 \text{ cm}$$

4.



Solution

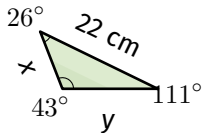
$$x = 7.4 \frac{\sin 81^\circ}{\sin 67^\circ} = 7.9$$
$$y = 7.4 \frac{\sin 32^\circ}{\sin 67^\circ} = 4.3$$
$$P = 19.6 \text{ cm}$$

Push Tasks

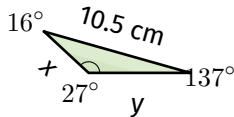


Find x , y , then the perimeter, keeping exact values between calculations.

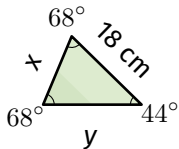
5.



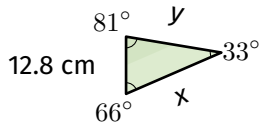
6.



7.



8.

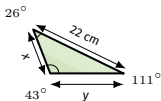


Push Tasks — Answers



For each triangle, find x , y , then the perimeter. Decide which side to calculate first, and use exact calculator values in the second calculation.

5.



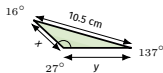
Solution

$$x = 22 \frac{\sin 111^\circ}{\sin 43^\circ} = 30.1$$

$$y = 22 \frac{\sin 26^\circ}{\sin 43^\circ} = 14.1$$

$$P = 66.3 \text{ cm}$$

6.



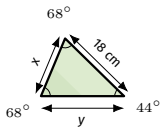
Solution

$$x = 10.5 \frac{\sin 137^\circ}{\sin 27^\circ} = 15.8$$

$$y = 10.5 \frac{\sin 16^\circ}{\sin 27^\circ} = 6.4$$

$$P = 32.6 \text{ cm}$$

7.



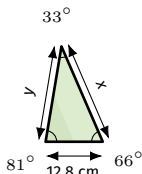
Solution

$$x = 18 \frac{\sin 44^\circ}{\sin 68^\circ} = 13.5$$

$$y = 18 \frac{\sin 68^\circ}{\sin 68^\circ} = 18.0$$

$$P = 49.5 \text{ cm}$$

8.



Solution

$$x = 12.8 \frac{\sin 81^\circ}{\sin 33^\circ} = 23.2$$

$$y = 12.8 \frac{\sin 66^\circ}{\sin 33^\circ} = 21.5$$

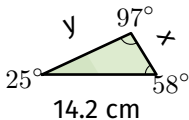
$$P = 57.5 \text{ cm}$$

Push Tasks

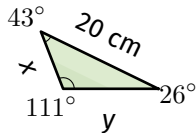


Find x , y , and the perimeter, then explain one reasonableness check.

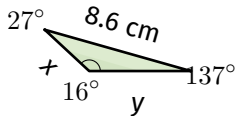
9.



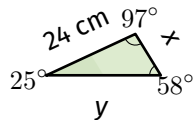
10.



11.



12.

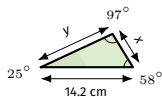


Push Tasks — Answers



For each triangle, find x , y , and the perimeter, then explain one reasonableness check.

9.



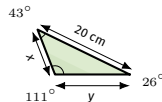
Solution

$$x = 14.2 \frac{\sin 25^\circ}{\sin 97^\circ} = 6.0$$

$$y = 14.2 \frac{\sin 58^\circ}{\sin 97^\circ} = 12.1$$

$P = 32.4$ cm; longest side opp 97°

10.



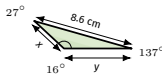
Solution

$$x = 20 \frac{\sin 26^\circ}{\sin 111^\circ} = 9.4$$

$$y = 20 \frac{\sin 43^\circ}{\sin 111^\circ} = 14.6$$

$P = 44.0$ cm; 20 opp 111° longest

11.



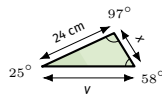
Solution

$$x = 8.6 \frac{\sin 137^\circ}{\sin 16^\circ} = 21.3$$

$$y = 8.6 \frac{\sin 27^\circ}{\sin 16^\circ} = 14.2$$

$P = 44.0$ cm; x opp 137° longest

12.



Solution

$$x = 24 \frac{\sin 25^\circ}{\sin 58^\circ} = 12.0$$

$$y = 24 \frac{\sin 97^\circ}{\sin 58^\circ} = 28.1$$

$P = 64.0$ cm; y opp 97° longest