Name _____

Date _____

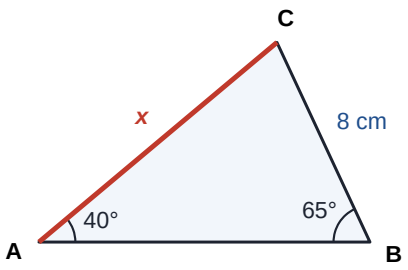
Sine rule or cosine rule?

Non-right-angled triangles. Give lengths to 3 significant figures and angles to 1 decimal place.

Part A: one of each

Each question tells you which rule to use. Diagrams are not drawn accurately.

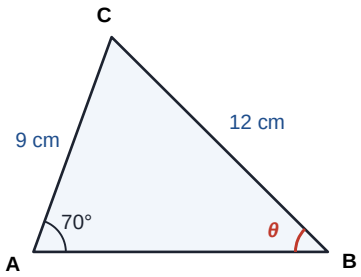
1 SINE RULE: FIND A SIDE



Find the length x.

Answer: _____

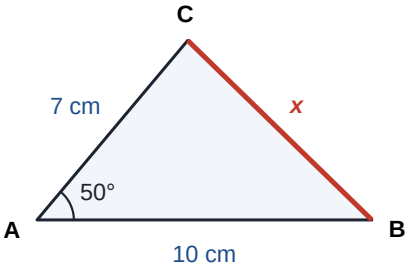
2 SINE RULE: FIND AN ANGLE



Find the angle θ.

Answer: _____

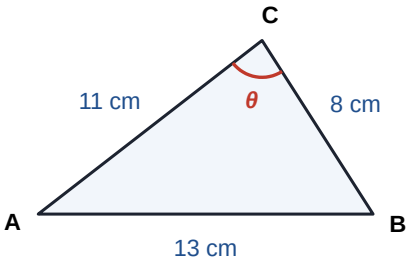
3 COSINE RULE: FIND A SIDE



Find the length x.

Answer: _____

4 COSINE RULE: FIND AN ANGLE



Find the angle θ.

Answer: _____

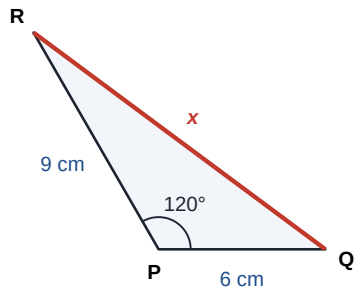
Part B: you decide

Sine rule $\dfrac{a}{\sin A} = \dfrac{b}{\sin B}$
Use it when you know a side *and* the angle opposite it (a matching pair), plus one more side or angle.

Cosine rule $a^2 = b^2 + c^2 - 2bc\cos A$
Use it when you know two sides and the angle between them, or all three sides.

For each triangle, tick the rule you need, then find the unknown. Each answer matches a letter in the code table. The letters from questions 1 to 8, in order, spell a word.

1

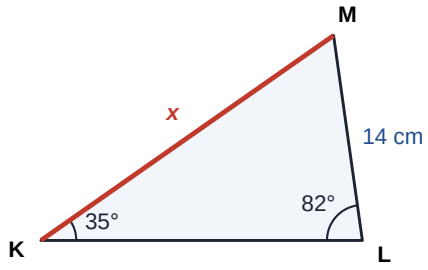


Find x.

Which rule? ☐ Sine ☐ Cosine

Answer: _____ Letter: ___

2

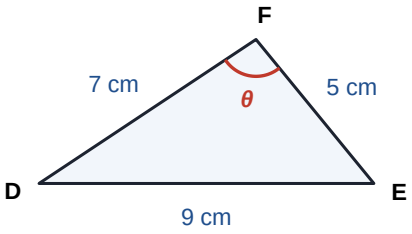


Find x.

Which rule? ☐ Sine ☐ Cosine

Answer: _____ Letter: ___

3

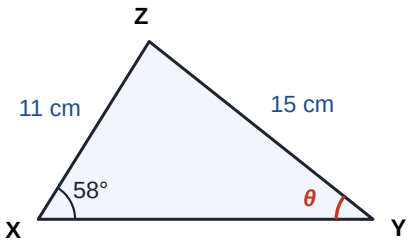


Find θ.

Which rule? ☐ Sine ☐ Cosine

Answer: _____ Letter: ___

4

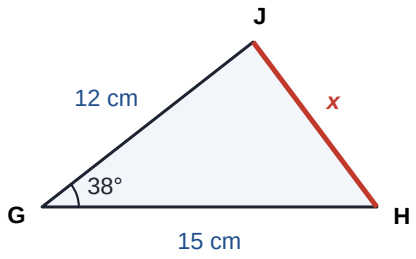


Find θ.

Which rule? ☐ Sine ☐ Cosine

Answer: _____ Letter: ___

5

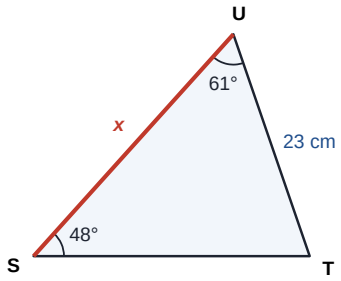


Find x.

Which rule? ☐ Sine ☐ Cosine

Answer: _____ Letter: ___

6

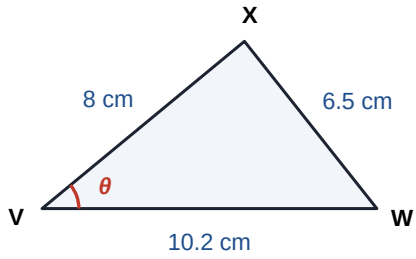


Find x. (Look carefully at which angles you are given.)

Which rule? ☐ Sine ☐ Cosine

Answer: _____ Letter: ___

7

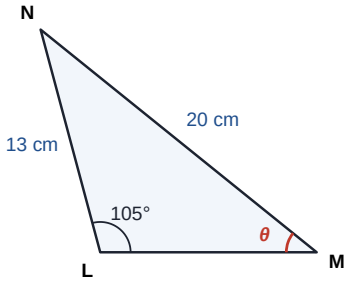


Find θ.

Which rule? ☐ Sine ☐ Cosine

Answer: _____ Letter: ___

8



Find θ.

Which rule? ☐ Sine ☐ Cosine

Answer: _____ Letter: ___

7.94	9.24	13.1	17.6	21.7	24.2	27.1	29.3	33.6	38.5	38.9	39.6	44.8	51.6	88.8	95.7
C	**N**	**T**	**D**	**P**	**R**	**O**	**G**	**S**	**A**	**E**	**L**	**U**	**M**	**H**	**I**

1	2	3	4	5	6	7	8

Answers

Part A

1. $\dfrac{x}{\sin 65^\circ} = \dfrac{8}{\sin 40^\circ} \Rightarrow x = \dfrac{8 \sin 65^\circ}{\sin 40^\circ} = 11.3$ cm

2. $\dfrac{\sin\theta}{9} = \dfrac{\sin 70^\circ}{12} \Rightarrow \sin\theta = \dfrac{9 \sin 70^\circ}{12} \Rightarrow \theta = 44.8^\circ$

3. $x^2 = 7^2 + 10^2 - 2(7)(10)\cos 50^\circ \Rightarrow x = 7.68$ cm

4. $\cos\theta = \dfrac{8^2 + 11^2 - 13^2}{2(8)(11)} \Rightarrow \theta = 84.8^\circ$

Part B

1. Cosine rule. $x^2 = 9^2 + 6^2 - 2(9)(6)\cos 120^\circ = 171 \Rightarrow x = 13.1$ cm → **T**

2. Sine rule. $x = \dfrac{14 \sin 82^\circ}{\sin 35^\circ} = 24.2$ cm → **R**

3. Cosine rule. $\cos\theta = \dfrac{5^2 + 7^2 - 9^2}{2(5)(7)} = -0.1 \Rightarrow \theta = 95.7^\circ$ → **I**

4. Sine rule. $\sin\theta = \dfrac{11 \sin 58^\circ}{15} \Rightarrow \theta = 38.5^\circ$ → **A**

5. Cosine rule. $x^2 = 12^2 + 15^2 - 2(12)(15)\cos 38^\circ \Rightarrow x = 9.24$ cm → **N**

6. Sine rule. The third angle is $180^\circ - 48^\circ - 61^\circ = 71^\circ$, opposite x. $x = \dfrac{23 \sin 71^\circ}{\sin 48^\circ} = 29.3$ cm → **G**

7. Cosine rule. $\cos\theta = \dfrac{8^2 + 10.2^2 - 6.5^2}{2(8)(10.2)} \Rightarrow \theta = 39.6^\circ$ → **L**

8. Sine rule. $\sin\theta = \dfrac{13 \sin 105^\circ}{20} \Rightarrow \theta = 38.9^\circ$ → **E**

The word is **TRIANGLE**. Some of the other letters come from common slips: using the given angle in question 6 instead of finding the third angle, finding the wrong angle in questions 3 and 7, or taking $\cos 120^\circ$ as positive in question 1.