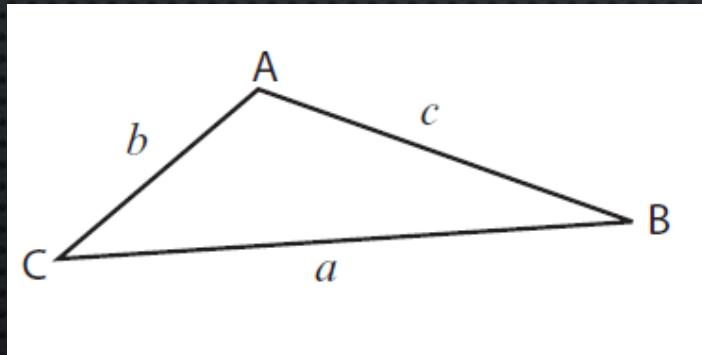# SINE RULE AND PROOF

YOU NEED TO LEARN THE PROOF

SINE RULE

WE USE THIS RULE TO FIND THE LENGTHS OF SIDES, SIZES OF ANGLES OF ANY KIND OF TRIANGLE.
TO 'SOLVE A TRIANGLE' MEANS YOU MUST CALCULATE THE UNKNOWN
SIDES AND ANGLES.

**IF YOU HAVE ENOUGH INFORMATION ABOUT THE SIDES AND ANGLES OF ANY TRIANGLE,
YOU CAN USE THE SINE RULE TO FIND THE OTHER SIDES AND ANGLES.**

SINE RULE

THE RATIO OF SINE OF THE ANGLE DIVIDED BY THE SIDE OPPOSITE THAT ANGLE IS THE SAME FOR ALL THREE
PAIRS OF SIDES AND ANGLES.

$$IN\ \Delta\ ABC:$$

- $$\frac{Sin\ A}{a} = \frac{Sin\ B}{b} = \frac{Sin\ C}{c}$$

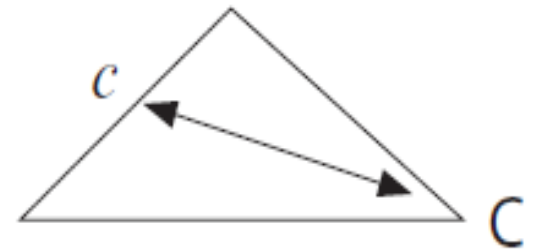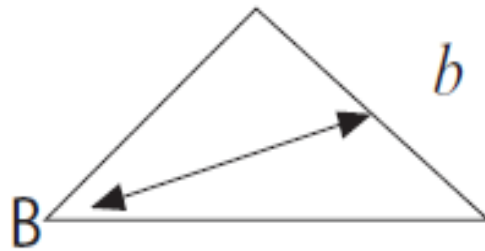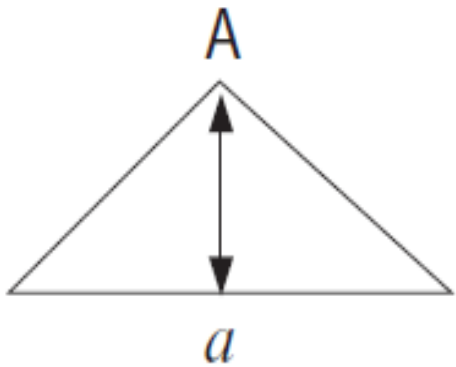OR

- $$\frac{a}{Sin\ A} = \frac{b}{Sin\ B} = \frac{c}{Sin\ C}$$

Which one to use in an application question will depend on the information given.

SINE RULE

To use the **sine rule** you need to know at least one side and its matching opposite angle and one more side or angle.
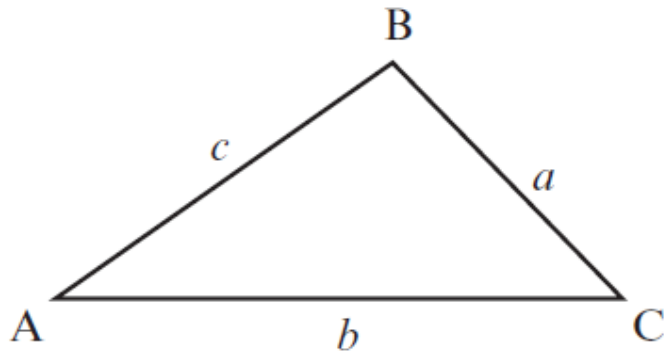

The sine rule can be used to solve many problems if the right information about the triangle is given.
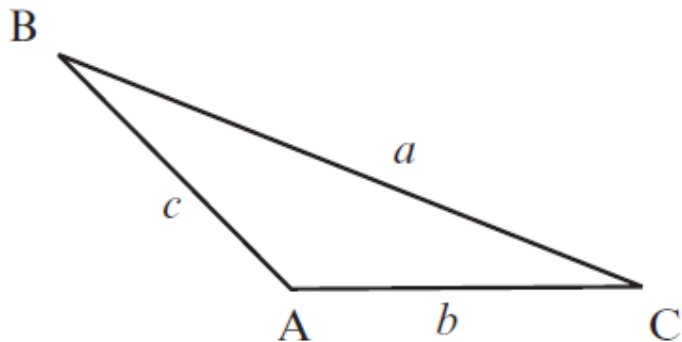
SINE RULE
PROOF

If Â is acute

If Â is obtuse

USING THE AREA RULE

$$\frac{1}{2}b.c.Sin\ A = \frac{1}{2}a.b.Sin\ C = \frac{1}{2}a.c.Sin\ B$$

DIVIDE EACH EXPRESSION BY $\frac{1}{2}a.b.c$

$$\frac{\frac{1}{2}b.c.Sin\ A}{\frac{1}{2}a.b.c} = \frac{\frac{1}{2}a.b.Sin\ C}{\frac{1}{2}a.b.c} = \frac{\frac{1}{2}a.c.Sin\ B}{\frac{1}{2}a.b.c}$$

$$\therefore \frac{Sin\ A}{a.} = \frac{Sin\ B}{b} = \frac{Sin\ C}{c}$$

OR BY INERTING THE EXPRESSIONS

$$\frac{a}{Sin\ A} = \frac{b}{Sin\ B} = \frac{c}{Sin\ C}$$