Sine Law: Yes or No?

Learning Goal
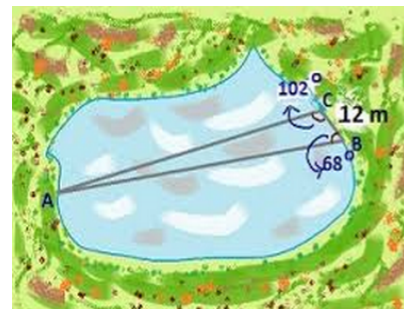

Minds on Math...
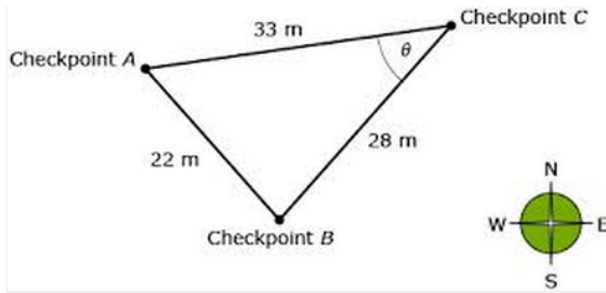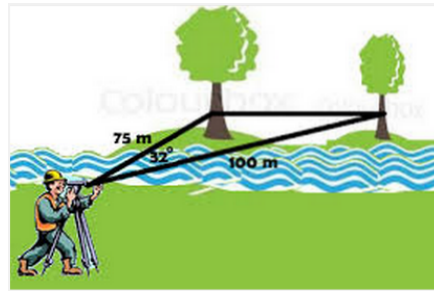
Sine Law: Yes or No?
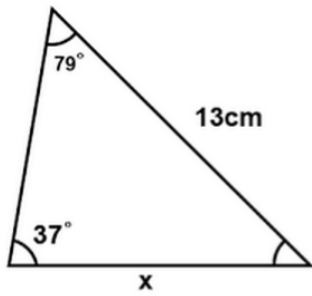
- Decide whether the following can be solved using the *Sine Law*
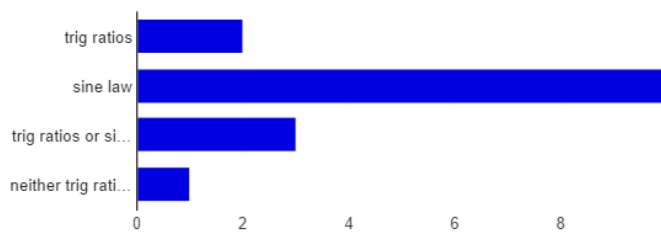- Justify your decisions

Survey Link

http://goo.gl/forms/ImwxwmfgQv

For the triangle shown, would you use the trig ratios (sin, cos, or tan), the sine law, both, or neither?

trig ratios	**2**	14.3%
sine law	**10**	71.4%
trig ratios or sine law	**3**	21.4%
neither trig ratios nor sine law	**1**	7.1%
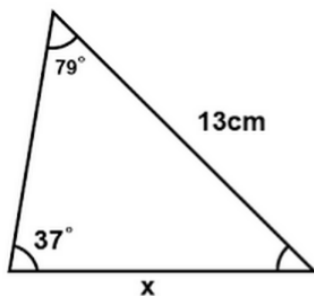
For the triangle below, would you use the trig ratios (sin, cos, tan), sine law, both, or neither?
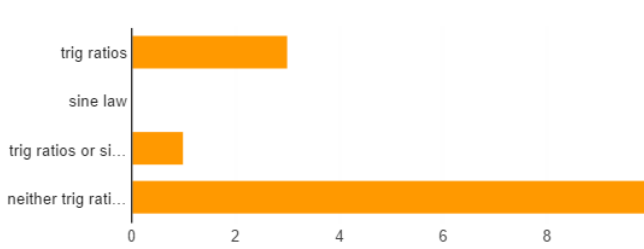
trig ratios	3	21.4%
sine law	0	0%
trig ratios or sine law	1	7.1%
neither trig ratios nor sine law	10	71.4%
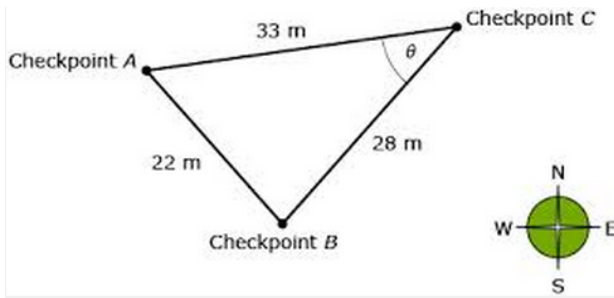
For the triangle below, would you use the trig ratios, sine law, both, or neither?
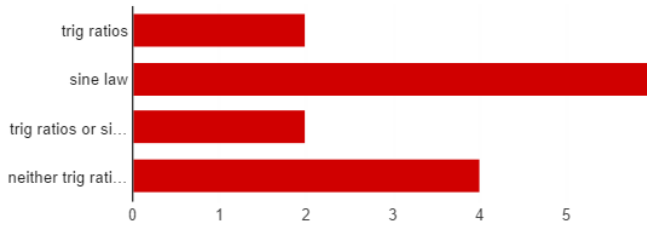
trig ratios	2	14.3%
sine law	6	42.9%
trig ratios or sine law	2	14.3%
neither trig ratios nor sine law	4	28.6%

For the triangle below, would you use the trig ratios, sine law, both, or neither?
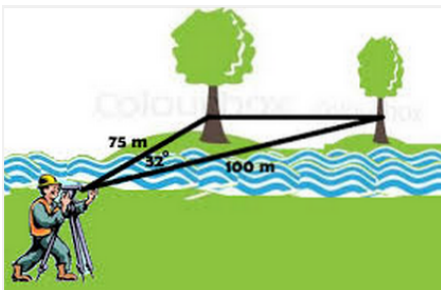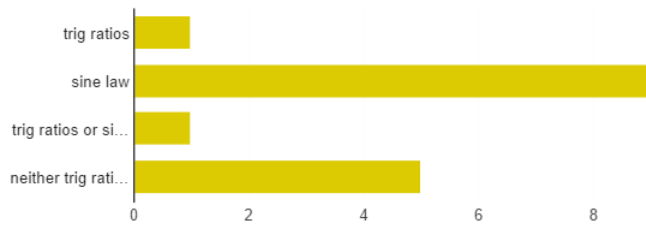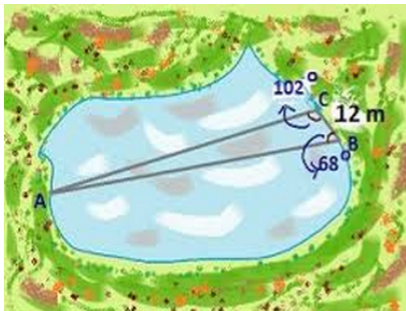

trig ratios	1	7.1%
sine law	9	64.3%
trig ratios or sine law	1	7.1%
neither trig ratios nor sine law	5	35.7%

Formula Flowchart for Trigonometry

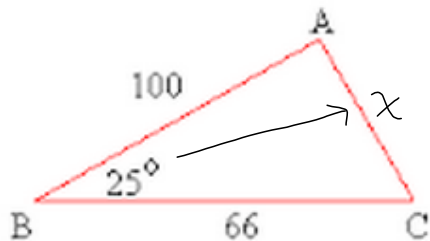Source: http://newton.burney.ws/math/guides/trigflowchart.gif
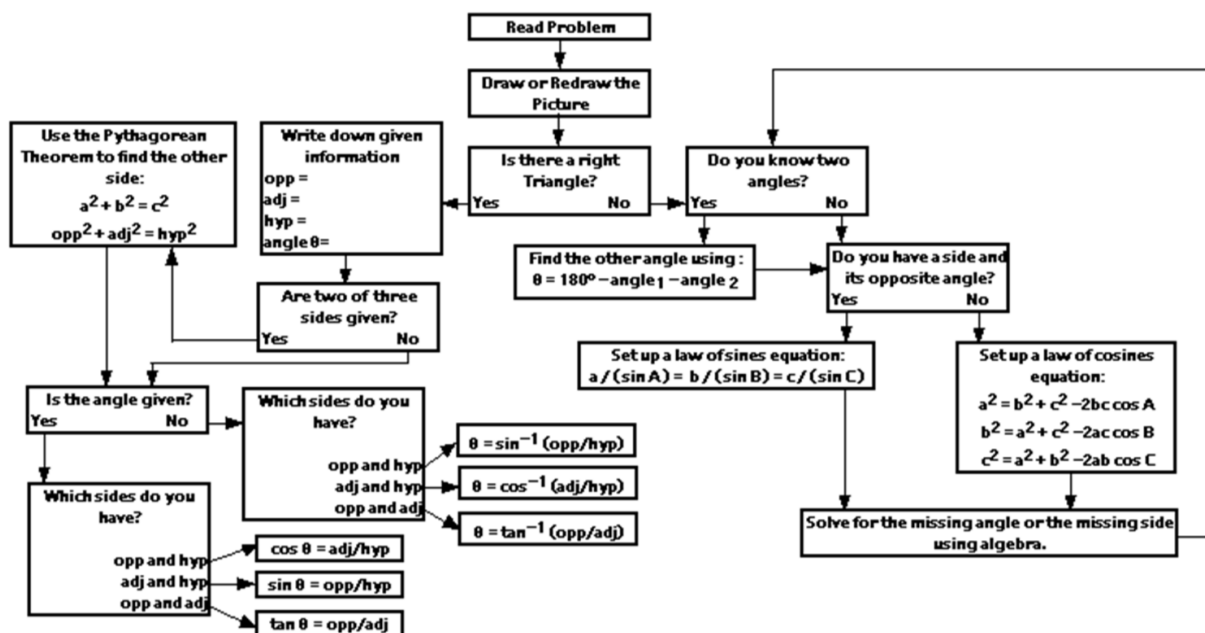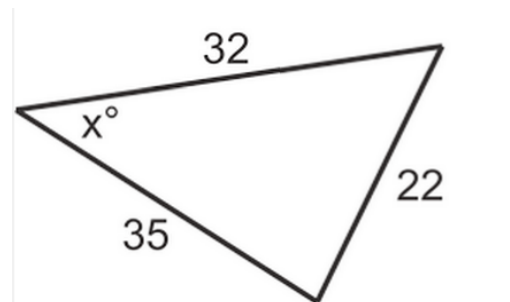
The Cosine Law

The Cosine Law is used in non-right triangles in these two instances:

SAS
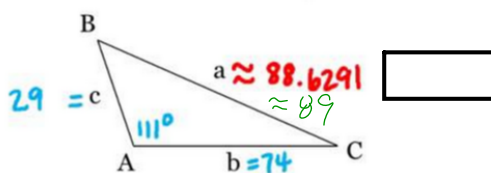

Calculate the length of the side across from the angle

SSS

Calculate the measure of any angle

Example: SAS

Ex: Let $\triangle ABC$ be an oblique triangle with $A = 111°$, b= 74, and $c = 29$. Solve the triangle.

$a \approx 88.6291$
≈ 89

Law of Cosines:

Suppose a triangle has angles A, B, and C with opposite sides of a, b, and c, respectively. Then, the law of cosines says the following.

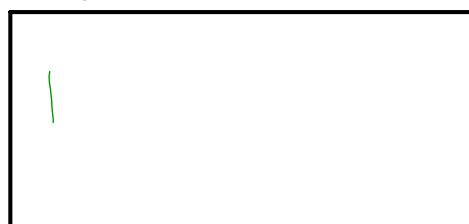$$a^2 = b^2 + c^2 - 2bc\cos A$$
$$b^2 = a^2 + c^2 - 2ac\cos B$$
$$c^2 = a^2 + b^2 - 2ab\cos C$$

A, b, C

$$a^2 = (74)^2 + (29)^2 - 2(74)(29)\cos 111°$$
$$a = \sqrt{(74)^2 + (29)^2 - 2(74)(29)\cos 111°}$$
$$\approx 88.6291$$
$$\approx 89$$

Example: SSS

Solve for angle B to the nearest tenth.

A

$c = 12$ $18 = b$

B $a = 22$ C
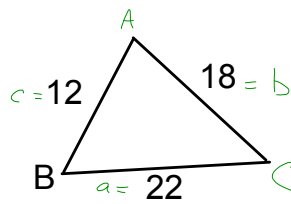
$$b^2 = c^2 + a^2 - (2ac \cdot \cos B)$$

$18^2 = 12^2 + 22^2 - (2(12)(22)\cos B)$	Law of Cosines
$324 = 144 + 484 - (2(12)(22)\cos B)$	Simplify squares
$324 = 144 + 484 - (528\cos B)$	Multiply
$324 = 628 - (528\cos B)$	Add
$\dfrac{-304}{-528} = \dfrac{-528\cos B}{-528}$	Subtract 628
$0.575757576 = \cos B$	Divide by -528
$54.8° \approx B$	$\cos^{-1}(0.575757576)$

Practice:

MBF 3C:

p39 #1a, 2b, 5, 7

MAP 4C:

p110 #1a, 4b, 8, 12