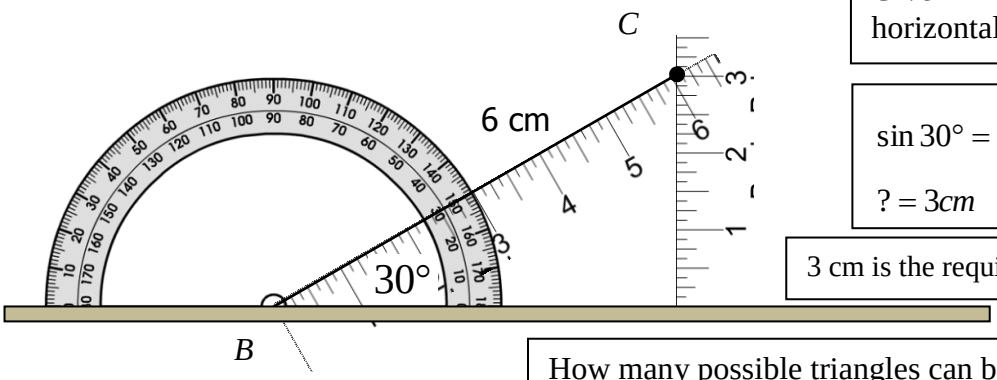
SSA Triangles Investigations Date:

SINE Law (Alternate possibilities!!)

Sine Law can be used to compute the remaining sides of a triangle when two angles and a side are known. It can also be used when two sides and one of the non-enclosed angles are known. In some such cases, the triangle is not uniquely determined by this data (called the *ambiguous case*) and the technique gives two possible values for the enclosed angle. You are going to learn in more detail in the next course.

SSA: when the given angle *B* is acute!



Given ΔABC where point ***A*** is on the horizontal, line and a line segment *AC*.

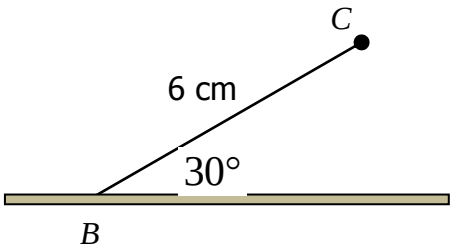
$$\sin 30° = \frac{?}{6cm}$$
$$? = 3cm$$

$$\sin 30° = \frac{3cm}{6cm} = 0.5$$

3 cm is the required length to form a right triangle.

How many possible triangles can be formed in each case?

SSA: Case 1: If *AC* = 3 cm



1 right triangle can be formed

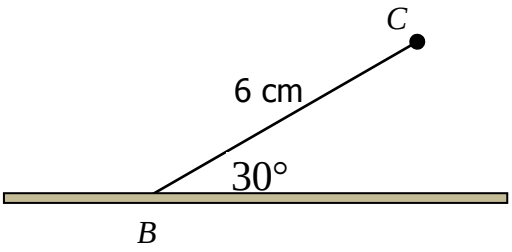
$a \sin B = b$

$6 \sin 30° = 3$

$3 = 3$

ie: *AC* = *3* cm

SSA: Case 2: If *AC* < 3 cm



No triangle can be formed

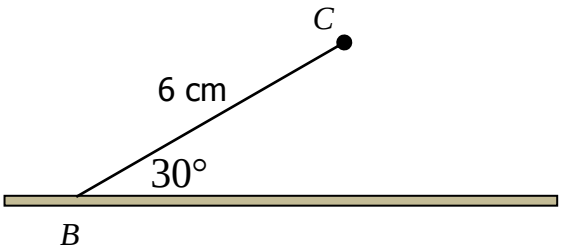
$a \sin B > b$

$6 \sin 30° > 2$

$3 > 2$

ie:
Let *AC* = ***2*** cm

SSA: Case 3: If 3 cm < *AC* < *6* cm



2 triangles can be formed

$a \sin B < b < a$

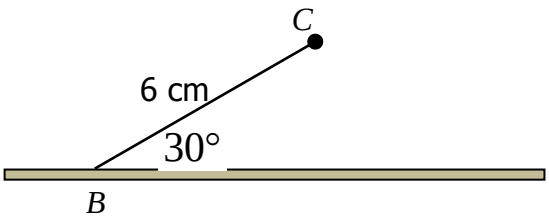
$6 \sin 30° < 4 < 6$

$3 < 4 < 6$

ie:
Let *AC* = ***4*** cm

SSA Triangles Investigations Date:

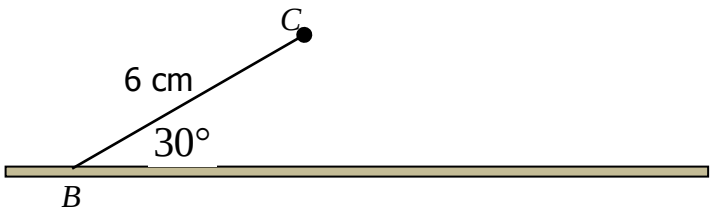
SSA: Case 4: If *AC* = *6* cm



1 isosceles triangle can be formed
$a = b$ $6 = 6$

ie:
AC = ***6*** cm

SSA: Case 5: If *AC* > *6* cm



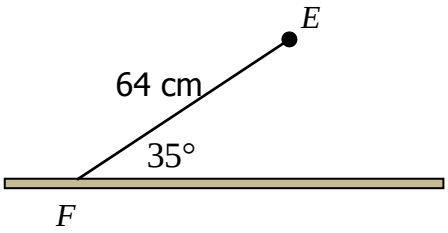
1 obtuse triangle can be formed
$a < b$ $6 < 8$

ie:
Let *AC* = ***8*** m

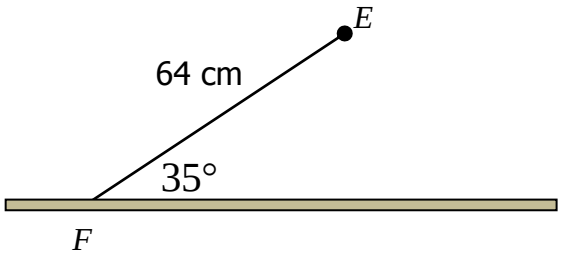
Note: SSA: What if the given angle *B* is an obtuse?

Example:

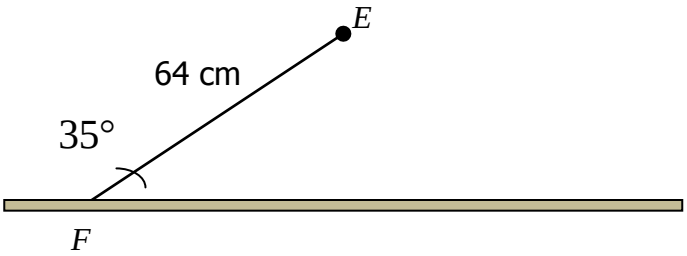
In ΔDEF, d = 64cm, f = 42 cm, and $\angle F = 35°$. Solve the triangle.
Round to nearest degrees and nearest tenth - centimeters.



Triangle 1



Triangle 2



Exercise:

Solve each triangle. Round your answers to the nearest tenth.

1) In $\Delta PQR, \angle P = 75°, r = 38, p = 10$
2) In $\Delta EFD, \angle E = 41°, d = 33, e = 31$
3) In $\Delta QPR, \angle Q = 34°, p = 37, q = 28$
4) In $\Delta CAB, \angle C = 67°, b = 40, c = 39$

Answers

1) No triangle
2) $\angle F = 94.7°, \angle D = 44.3°, f = 47.1$ or $\angle F = 3.3°, \angle D = 135.7°, f = 2.7$
3) $\angle R = 98.4°, \angle P = 47.6°, r = 49.5$ or $\angle R = 13.6°, \angle P = 132.4°, r = 11.8$
4) $\angle A = 42.4°, \angle B = 70.8°, a = 28.5$ or $\angle A = 3.8°, \angle B = 109.2°, a = 2.8$