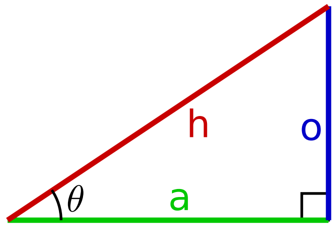


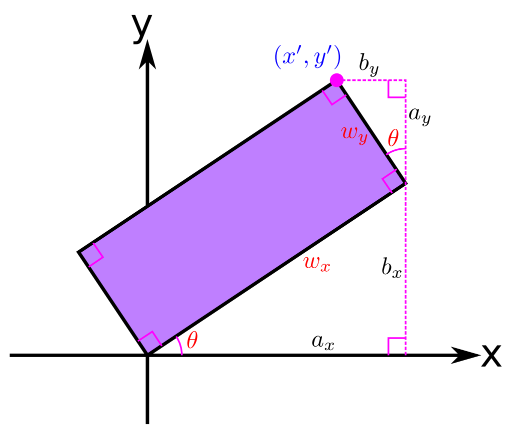
Problem 1 (2 marks): Given a right triangle that has a named angle of $\theta = 65°$, and an adjacent of $a = 67.22$, compute both the opposite o and the hypotenuse h to 4 significant digits.

Problem 2 (2 marks): Given a right triangle that has a named angle of $\theta = 40°$, and a hypotenuse of $h = 3.500 \times 10^5$, compute both the adjacent a and the opposite o to 4 significant digits.

Problem 3 (2 marks): Given a right triangle that has a named angle of $\theta = 50°$, and an opposite of $o = 9.988 \times 10^{-3}$, compute both the adjacent a and the hypotenuse h to 4 significant digits.

Problem 4 (2 marks):

In the x, y coordinate system, is a box of width w_x and height w_y. The bottom left corner of the box is anchored to the origin $(0, 0)$ point. Initially the box's width w_x is along the positive x axis, and the box's height w_y is along the positive y axis. The box is rotated counterclockwise by an angle of θ with the bottom left corner still anchored to the origin point. Find the new x and y coordinates (x', y') of the top right corner of the box after the rotation. **Give x' and y' as expressions involving only the quantities w_x, w_y, and θ.**



Problem 5 (15 marks): Fill in the table below:
For each empty cell, insert one of the following values or ranges:
0, 1, -1, $\pm\infty$, $(0, 1)$, $(-1, 0)$, $(0, +\infty)$, $(-\infty, 0)$, $(1, +\infty)$, $(-\infty, -1)$
The chosen range must be tight: the range $(0, +\infty)$ is the incorrect choice when the range is actually $(1, +\infty)$.

θ	$\cos\theta$	$\sin\theta$	$\tan\theta$	$\sec\theta$	$\cot\theta$	$\csc\theta$
$\theta = 0$	1	0	0	1	$\pm\infty$	$\pm\infty$
$\theta \in (0, \pi/2)$	$(0, 1)$	$(0, 1)$	$(0, +\infty)$	$(1, +\infty)$	$(0, +\infty)$	$(1, +\infty)$
$\theta = \pi/2$	0	1	$\pm\infty$	$\pm\infty$	0	1
$\theta \in (\pi/2, \pi)$	$(-1, 0)$	$(0, 1)$	$(-\infty, 0)$	$(-\infty, -1)$	$(-\infty, 0)$	$(1, +\infty)$
$\theta = \pi$						
$\theta \in (\pi, 3\pi/2)$						
$\theta = 3\pi/2$						
$\theta \in (3\pi/2, 2\pi)$						
$\theta = 2\pi$						

Problem 6 (bonus 6 marks):

In the image of the right, a tree with a known height of $d = 10.00$m is on top of a hill with an incline of $\theta = 20°$. From the bottom of the hill, the "angular size" of the tree is $\phi = 5°$. Compute all of:

- x, the **horizontal** distance of the tree from the observer.
- y, the altitude of the base of the tree.
- z, the distance of the base of the tree from the observer.