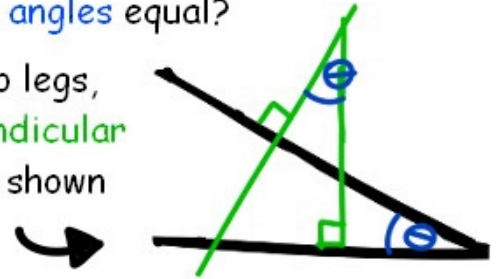# Understanding Angles on Inclined Planes
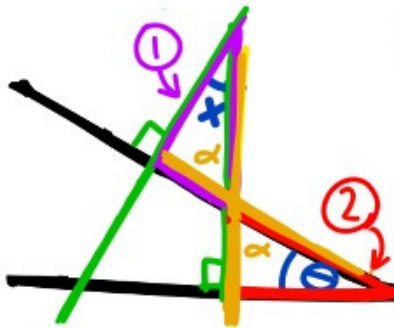## (for Physics 204)

Question: Why are the two blue angles equal?

Rule: For any angle with two legs, when you draw a line perpendicular to each leg, the blue angles shown are the same.

Proofs

1) Look at the inclined plane as two right triangles, the purple triangle (triangle 1) and the red triangle (triangle 2).

When two lines intersect like this: → they have equal opposite angles.
So the two right triangles each have an angle α.

Let's call the angle in triangle 1 x and triangle 2 $\ominus$.
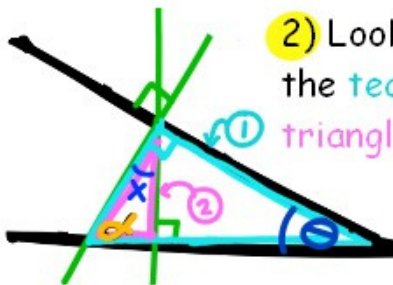We can solve for x and $\ominus$ as follows:

Triangle 1:
$$90° + \alpha + x = 180°$$
$$\alpha + x = 90°$$
$$x = 90° - \alpha$$

Triangle 2:
$$90° + \alpha + \ominus = 180°$$
$$\alpha + \ominus = 90°$$
$$\ominus = 90° - \alpha$$

$$90° - \alpha = x = \ominus$$
Thus $\ominus = x$.

2) Look at the inclined plane as two overlapping right triangles, the teal triangle (triangle 1, the big one) and the pink triangle (triangle 2, the small one). Both triangles share angle α.

We can solve for x and $\ominus$ as follows:

Triangle 1:
$$90° + \alpha + \ominus = 180°$$
$$\alpha + \ominus = 90°$$
$$\ominus = 90° - \alpha$$

Triangle 2:
$$90° + \alpha + x = 180°$$
$$\alpha + x = 90°$$
$$x = 90° - \alpha$$

$$90° - \alpha = x = \ominus$$
Thus $\ominus = x$

Made with Guidance from Dr. Oz Bonfim