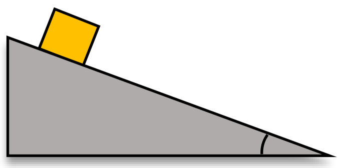
**CONCEPT: WORK BY GRAVITY ON INCLINED PLANES**

● Remember that $\theta$ in **W=Fdcos$\theta$** is ALWAYS the angle *between* **F** and **Δx** (**d**).

- For incline planes, be careful **NOT** to plug in the incline angle $\theta_x$ into Fdcosθ!

EXAMPLE**:** A 100kg box is released at the top of a 12m-long incline making a 37° angle with the horizontal**.** Calculate the work done on the box by **$mg_x$**, **$mg_y$,** and **mg.**



| WORK & ENERGY |
| --- |
| $KE = \frac{1}{2}mv^2$ |
| $W = Fdcos\theta$ |
| $W_g = \pm mg\Delta y$ |
| $W_{NET} = \Delta K = K_f - K_i$ |

PROBLEM**:** You pull a 19 kg crate at rest up a 15m ramp inclined at 36° above the horizontal**.** You pull with a constant 130N force parallel to the ramp**.** Calculate **a)** the work done by gravity**; b)** the final kinetic energy of the crate**.**

| WORK & ENERGY |
|---|
| $KE = \frac{1}{2}mv^2$ |
| $W = Fd\cos\theta$ |
| $W_g = -mg\Delta y$ |
| $W_{NET} = \Sigma W = F_{NET}d\cos\theta = \Delta K$ |

PROBLEM**:** A 7kg crate slides 2.5m down a ramp inclined at 26°**.** The coefficient of friction is 0.36**. a)** Calculate the work done by gravity**. b)** Calculate the work done by friction**. c)** Find the speed of the crate if it starts from rest**.**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