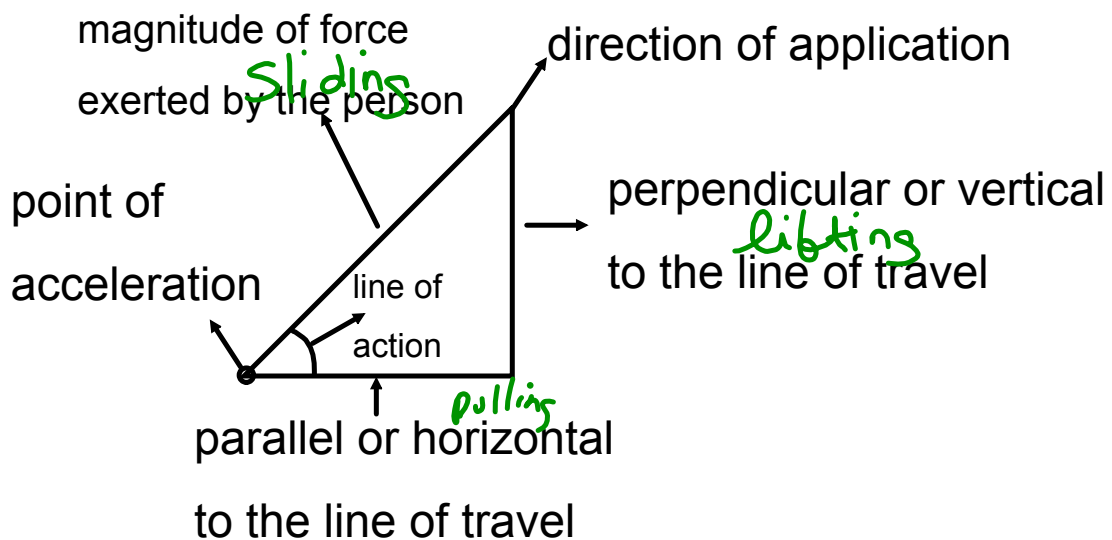


# Effective Force Notes

def: direction in which the movement of an object or person is moving.



- Any time a weight is given in kg, it must be converted to N, therefore you x by 9.8 N/kg
- There are 4 types of questions which can be asked, trigonometry is used to solve for the unknown. **Cos and Sin used, never Tan.**
- Force and effective force are not the same thing. Force is the effort being put, NOT the direction

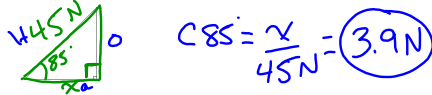
Type 1- pulling questions

a) Force given looking for effective force (direction)

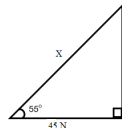


- finding the horizontal or parallel to line of travel
- cos always used

What is the effective force when a man pulls a box with a force of 45 N at an 85° angle?

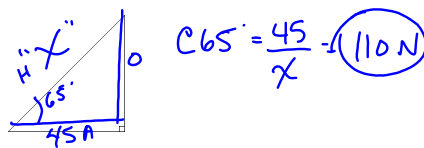


b) Effective force given, looking for force



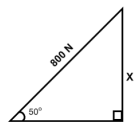
- Looking for hypotenuse
- cos always used

What is the force used when the effective force of pulling a bag is 45 N with a 65° angle?



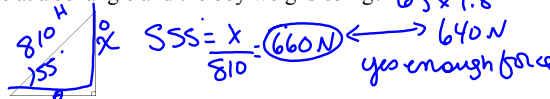
Type 2 - Lifting an object

a) force given, looking for effective force (direction)

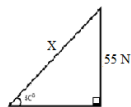


- finding perpendicular or vertical to line of travel.
- sin always used
- multiple weight by 9.8

1. Could a man lift his son off the ground if he is using 810 N of force at a 55° angle and the boy weighs 65 kg?  $65 \times 9.8$

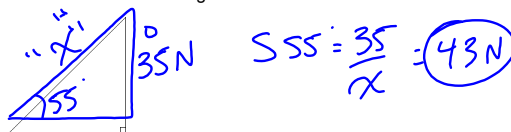


b) effective force given, looking for force

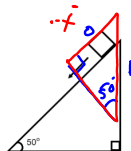


- Looking for hypotenuse
- sin always used

What is the force used by a man when he lifted a bag with an effective force of 35 N at a 55° angle?

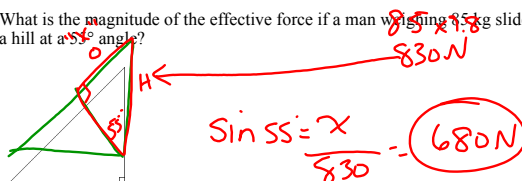


Type 3- Sliding or rolling down a ramp/hill



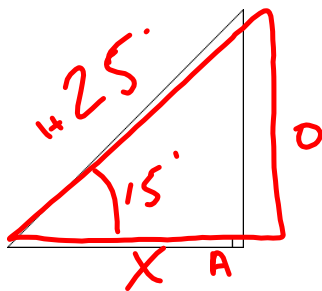
- Finding effective force perpendicular to force.
- Use slide - split - sin rule
- Weight of person put on hypotenuse.

What is the magnitude of the effective force if a man weighing 85 kg slides down a hill at a 55° angle?



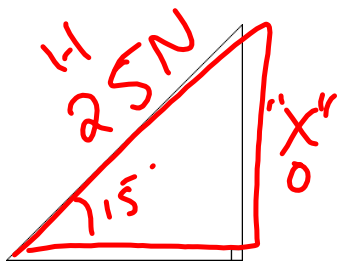
**Combination question of pulling and lifting**

A- What is the effective force when a boy pulls a sled with a force of 25 N at a 15° angle?



$$\cos 15^\circ = \frac{X}{25} = \textcircled{24 \text{ N}}$$

B- If the sled weighed 1.5 kg, could it be lifted off the ground?



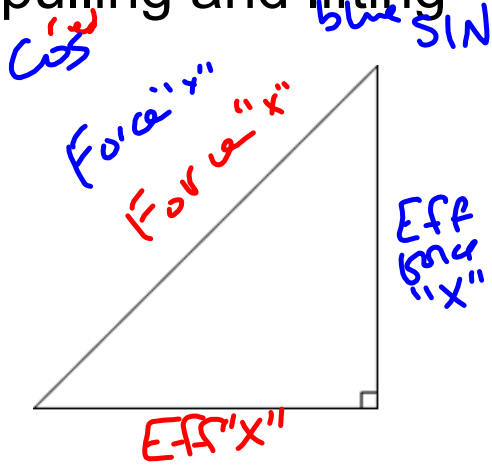
$$1.5 \times 9.8 = 15 \text{ N}$$

$$\sin 15^\circ = \frac{Y}{25} = \textcircled{6.5 \text{ N}}$$

No, not enough force

# Recap

pulling and lifting



Sliding

